United States Court of Appeals
for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

JOINT APPENDIX

IN THE
United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 13,517

614

GEORGE F. STRADAR AND FAIRCHILD CAMERA
AND INSTRUMENT CORPORATION,
Appellants,
v.

ROBERT C. WATSON, Commissioner of Patents,
Appellee.

Appeal from the United States District Court
for the District of Columbia

United States Court of Appeals
For the
District of Columbia Circuit

FILED OCT 8 1956

Joseph W. Stewart
CLERK

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No. 13,517

GEORGE F. STRADAR AND FAIRCHILD CAMERA AND INSTRUMENT CORPORATION,
Appellants,

v.

ROBERT C. WATSON, Commissioner of Patents,
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Appeal from the United States District Court for the District of Columbia

JOINT APPENDIX

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84 Filed June 7, 1954

DISTRICT COURT OF THE UNITED STATES

For the District of Columbia

Civil Action No. 2426-54

◆

George F. Stradar,
45 Berkeley Road,
Mineola, N. Y.,

and

Fairchild Camera and Instrument Corporation,
a corporation,
Robbins Lane,
Syosset, N. Y.

Plaintiffs,

v.

Robert C. Watson,
Commissioner of Patents,
Washington 25, D. C.,

Defendant.

◆

Civil Action for Issuance of a Patent

COMPLAINT

To the Honorable Judges of the District Court of the United States for the District of Columbia.

Plaintiffs herein for their complaint state:

Jurisdiction

1. This Action arises under Title 35, United States Code, Section 145 (66 Stat. 803) and the Act of July 19, 1952, c. 950, Section 5 (66 Stat. 815).

Parties

2. Plaintiff George F. Stradar is a resident of the City of Mineola, County of Nassau, and State of New York, is the applicant in patent application, Serial No.
85 203,310, filed in the United States Patent Office on December 29, 1950, and entitled "Image-Engraving Plate and Process of Producing the Same", and is the original and first inventor of the invention disclosed and claimed in said application.

3. Plaintiff Fairchild Camera and Instrument Corporation is a corporation duly organized and existing under the laws of the State of Delaware and has a regular and established place of business at Robbins Lane, Syosset, New York.

4. Defendant, Robert C. Watson, is the United States Commissioner of Patents and is officially a resident of Washington, in the District of Columbia, within the jurisdiction of this Court.

Grounds of Complaint

5. On or about December 26, 1950, George F. Stradar, one of the Plaintiffs herein, executed an application for United States Letters Patent for an invention made by him and entitled "Image-Engraving Plate and Process of Producing the Same".

6. Simultaneously with the execution of said application for United States Letters Patent, said George F. Stradar duly executed and delivered to Fairchild Camera and Instrument Corporation, one of the Plaintiffs herein, a written assignment of the entire right, title and interest in and to his invention for "Image-Engraving Plate and Process of Producing the Same" described and claimed in said application for United States Letters Patent.

86 7. On or about December 29, 1950, said George F. Stradar duly made application in writing in the

United States Patent Office for the grant of Letters Patent to him on his invention, which application was given serial number 203,310.

8. Simultaneously with the filing of his application for United States Letters Patent on his invention for "Image-Engraving Plate and Process of Producing the Same", said George F. Stradar also filed for recording in the United States Patent Office the executed assignment of his invention and application for Letters Patent on "Image-Engraving Plate and Process of Producing the Same", said assignment being duly recorded on December 29, 1950, in Liber 0226, Page 373.

9. Said application Serial No. 203,310 contains claims numbered 1 to 14, inclusive, to which Plaintiffs believe they are entitled.

10. Said application Serial No. 203,310 was examined by the Primary Examiner in charge thereof who, on September 8, 1952, finally rejected claims 1 to 15, inclusive, thereof.

11. On March 6, 1953, an appeal was duly taken on behalf of Plaintiff George F. Stradar from said final rejection of September 8, 1952, to the Board of Appeals of the United States Patent Office and on April 30, 1954, said Board of Appeals rendered its decision wherein it
88 affirmed said final rejection with respect to aforesaid claims 1 to 14, inclusive, and reversed said final rejection with respect to aforesaid claim 15.

12. Plaintiffs allege that the decision of the Board of Appeals adjudging Plaintiff George F. Stradar not entitled to Letters Patent for the invention recited in claims 1 to 14, inclusive, is erroneous and contrary to law.

13. Plaintiffs further allege that no appeal has been taken by them or either of them to the United States Court of Customs and Patent Appeals from the refusal of the

Commissioner of Patents to issue Letters Patent to Plaintiff George F. Stradar and that, as provided in Patent Office Rule 304, the Complaint herein is filed within sixty (60) days of the date of the final decision of the Board of Appeals refusing to allow said claims 1 to 14, inclusive.

14. Plaintiffs make profert of a certified copy of aforesaid application for Letters Patent, Serial No. 203,310, and all proceedings and papers in the file thereof, together with certified copies of the patents forming the basis for aforesaid decision of the Board of Appeals refusing to allow said claims 1 to 14, inclusive, and refusing to issue Letters Patent on the invention in such claims, said certified copies to be produced as and when this Honorable Court shall direct.

89 WHEREFORE, Plaintiffs pray this Honorable Court:

1. To adjudge or decree that Plaintiffs are entitled to receive Letters Patent on the invention claimed in claims 1 to 14, inclusive, of said application Serial No. 203,310, in due form of law as prescribed by the Statutes.

2. For a judgment pursuant to Title 35, U. S. Code, Section 145 (66 Stat. 803), authorizing the Commissioner of Patents to issue Letters Patent on the invention claimed in claims 1 to 14, inclusive, of said application Serial No. 203,310, in due form of law and as prescribed by the Statutes.

3. That Plaintiffs have such other and further relief as the nature of this case may admit or require and as may be just and equitable.

GEORGE F. STRADAR and
FAIRCHILD CAMERA AND INSTRUMENT
CORPORATION

By LAURENCE B. DODDS
Attorney for Plaintiffs
58-25 Little Neck Parkway
Little Neck, N. Y.

Miles D. Pillars
National Press Building
Washington 4, D. C.
Of Counsel

* * * * * * * * * *

87 Filed June 23, 1954

ANSWER TO THE COMPLAINT

To the Honorable Judges of the United States District Court for the District of Columbia.

1. The defendant admits the allegations of paragraph 1 of the complaint.

2. He denies that the plaintiff, Stradar, is the original and first inventor of any subject matter involved in this action. He admits the remaining allegations of paragraph 2.

3, 4, 5, 6, 7, 8, 9, 10, 11. He admits the allegations of paragraphs 3 to 11, inclusive.

12. He denies the allegations of paragraph 12.

13, 14. He admits the allegations of paragraphs 13 and 14.

90 Further answering, the defendant states that the plaintiffs are not entitled to a patent containing any of the claims referred to in the complaint for the reasons given and in view of the references cited in the Examiner's answer and the decision of the Board of Appeals in the application here involved. Profert of copies of the said answer, decision, and references is hereby made.

Respectfully submitted,

E. L. Reynolds,
Solicitor, U. S. Patent Office,
Attorney for the Defendant.

June 22, 1954

I hereby certify that a copy of the foregoing ANSWER TO THE COMPLAINT was mailed today to Mr. Miles D. Pillars, National Press Bldg., Washington 4, D. C., attorney for the plaintiffs.

E. L. REYNOLDS,
Solicitor.

* * * * * * * * * *

1 EXCERPTS FROM TESTIMONY AND PROCEEDINGS

Washington, D. C.,
April 23, 1956.

The above-entitled matter came on for hearing before the HONORABLE ROBERT N. WILKIN, in Courtroom 14, United States District Court for the District of Columbia, 3rd Street and Constitution Avenue, Northwest, Washington, D. C., on April 23rd, 1956, commencing at 2:00 o'clock P. M.

APPEARANCES:

On behalf of Plaintiff:
LAURENCE B. DODDS, ESQ.
and
MILES D. PILLARS, ESQ.

On behalf of Defendant:
S. W. COCHRAN, ESQ.

* * * * * * * * * *

19 Mr. Dodds: I should like to offer in evidence as Plaintiff's Exhibit 1, the certified contents of file wrapper and contents of the Stradar patent application in the Patent Office.

The Court: It will be received.

(Plaintiff's Exhibit No. 1 was received in evidence.)

Mr. Dodds: I would like to offer as Plaintiff's Exhibit 2, a copy of the Boyajean patent, reissue 23914, to which I have referred a moment ago.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 2 was received in evidence.)

Mr. Dodds: And I would like to call as my first witness Mr. Stradar, the inventor.

Thereupon

20 **George F. Stradar**

was called as a witness by counsel for Plaintiff and, having been first duly sworn, was examined, and testified as follows:

Direct Examination

By Mr. Dodds:

Q. Will you please state your full name, residence, and occupation? A. My name is George F. Stradar; I reside at 45 Berkeley Road, in Mineola, New York. I am chief metallurgist of Fairchild Camera and Instrument Corporation.

Q. Would you state briefly your education and experience, particularly in the chemical field? A. My education goes back to matriculation at Polytechnical Institute of Brooklyn, in the course of chemical engineering. Subsequent to the completion of my work there, I took additional courses at New York University, and also at the University of the State of New York. Some of these were on the graduate level, some on undergraduate level.

My college work was done mostly in the evening, during the evening sessions, and I was employed, therefore, consistent with the educational pursuit that I was following, namely, as a chemist. I was employed with the E. W. Bliss Company in 1929 to 1931, as a chemist. My work there consisted of the chemical analysis of various irons, steels, ferrous and nonferrous products, plating solutions,
21 heat-treating salts, and various chemicals and compounds which would be found in the manufacture of heavy machinery.

Following that, I was employed by the Hartlide Metal Corporation, from 1931 to 1932. That was a foundry manufacturing stainless alloys of the nickel and chromium type. Again, my work was in the analysis of the various products used in foundry and foundry control, the analysis of the final end products.

In 1932 to 1934 I was associated with Mr. T. N. Holden, who is a consulting chemist and metallurgist. Again, the various work consisted chiefly of the chemical analysis and metallurgical advice given to people with problems in the chemical or metallurgical field, chiefly in the metallurgical, considering the forging or fabricating or heat treatment of ferrous and nonferrous products.

From 1934 to 1946, I was employed by the New York Testing Laboratories, which is a commercial laboratory. Again, I was employed as a chemist, and metallurgist, performing work on many consumer products, such as inks, paints, petroleum products, ferrous and nonferrous alloys, and also running physical tests on various alloys and consumer products. The experience was varied, as might be expected, in a commercial laboratory, testing a variety of products.

From 1946 to 1952 I was employed by the Board of Education of the City of New York as a teacher. I
22 taught heat treatment and metallurgy.

From 1952 to date, I have been employed by the Fairchild Camera and Instrument Corporation, and I was employed originally to set up a chemical metallurgical and physical testing laboratory for testing of their raw materials, finished products, and also for the solution of any manufacturing problems in which they might be involved.

Q. Mr. Stradar, would you relate the circumstances under which you undertook the work leading to the invention we are talking about here? A. Yes.

The plastic engraving plate met with some success, with considerable success in the field, with a new approach in the graphic arts. However, a number of difficulties arose in the application, or rather, the use of this plate in the various shops in applying this type of machine.

For instance, the setting of the dot structure on a level became rather indistinct to some operators, and they had difficulty in setting the contrast levels of the machines.

Now, by reversing the plate, it meant that a smooth surface was presented to the inking device, or to the stereotyping device, and that a blank would appear rather than the engraved image which was supposed to have been printed.

Also, it was found that many plates were inserted in the
press, or the copying device, upside down. Of
23 course, reaction to upside down pictures is rather
obvious to anybody reading newspapers, magazines,
and what have you.

There was also a psychological effect inasmuch as many of the printing people had been brought up with the idea that a plate had to be colored, and they could view that plate and arrive at some kind of a positive indication of what might be the reproduction in the finished article.

That, of course, was a minor consideration, the prime ones being to prevent any such reversal of the plate, or insertion in a manner not consistent with good printing. Subsequently, in 1949, I was requested to develop some method to eliminate any such possibilities.

And the plate, as we devised it now, has been the outcome of that.

Q. Can you tell me what were some of the essential requirements that the tinted plate, which you sought to produce, had to meet? A. Well, requirement was that by whatever—if I might digress a moment, Mr. Dodds, and explain why we attempted, if that is in order—

Q. Yes, it is. A. The solution of the problem, as it was
presented to me, led me to believe that if I tinted the top
surface and the substratum to a degree which was consis-
tent with the printing level, or the depth of cut, that
24 I would therefore have a surface which would be
removable in the engraving, and subsequently pro-

duce a cut visible, as a positive, to the operator of the machine.

The way I did that was to find a solvent to which I could introduce a dye, such solvent, however, being adjusted so that the depth of pentration would be consistent with the good engraving practice.

Also, the dye and/or solvent mixture could not materially, or could not in any way, destroy the surface of the printing or engraving plate; if it became so soft it was damaged in handling, it was also damaged in further engraving by means of the passing over of the engraving shoe.

Those were some of the—

Q. Should it not have any effect on the rate at which the plastic was thermally decomposed by the stylus of the machine? A. Yes, the burning rate is very important in the base nitrate used as the plate.

If the coating or tinting, whatever we shall term it as, had any effect on this, it would also put severe restrictions on the operation of the machine, as well as the quality of the end product or the engraved plate.

Q. Were there any requirements with respect to products of decomposition? A. Products of decomposition are important in the effect that we have an oxidizing effect upon the stylus itself, which does the engraving, and any material introduced as a coating which would further cause destruction of the stylus would also cause poor quality of reproduction.

Q. And what was the requirement with respect to the depth of impregnation of this tinting? A. The stratum, or the top stratum and substratum, to an extent of 1/10,000 of an inch was imposed as being the maximum limit to which I could penetrate.

Q. And were there any requirements with respect to its permanent or fugitive character? A. The top stratum and the substratum had to be of permanent nature, inasmuch as any subsequent handling of the sheet in the further printing procedures were important that it remain, and not be wiped off for several reasons, one of them being a smudging of the photographic or the engraving and, well, retention was important.

Q. Could you describe very briefly just what you did, or the time required in arriving at the solution of this problem? A. Well, when the problem was presented to me, I first obtained samples of the present engraving sheet we were using, decided on the attack to pursue, and adjusted various solvents, mixtures of dyes therein, made sample plates and scratched them or deformed them in some
26 manner to show what depth I was penetrating, to the fugitive nature of the coating, and also made some photomicrographs of the cross-section of the plates to show what the effect, the depth of penetration there, was.

I did as much as I could possibly do to simulate the service handling, what the service people or operators in the field would do in handling the plates.

By November of 1949 we had a dye which was composed essentially of methyl alcohol, and a methyl violet dye incorporated in it to the extent of two-tenths per cent dye to the 95 per cent solution of methyl alcohol. This dye formula was released to the manufacturing department for the fabrication of further manufacturing of plates.

Q. When was that, Mr. Stradar? A. That was in November of 1949.

Q. Can you tell me is just about any dye and solvent mixture formula suitable to tinting of the plate, or is there any critical type of dye mixture that must be used? A. There is a critical dye mixture. We have found that concentration of one-tenth per cent dye will produce a plate which is too light in nature, color, and a percentage of .5 per cent dye in alcohol produces a plate where you get a precipitation of excess dye on the surface of the plate and makes the top layer somewhat fugitive, it collects on the advance shoe, causing scratching and other errors
27 which are reproduced in the printing plate.

Q. Is there any relationship or optimum relationship as to the concentration of the solvent? I believe you mentioned a 95 per cent methyl alcohol. What happens if you use a more dilute solution of alcohol? A. If we use a more dilute solution of alcohol, it has been found that the evaporation rate is considerably slowed and, as a consequence, we get a softening of the top surface of the plate.

We also arrive at a condition known as blushing, whereby the precipitation of such moisture, physically and chemically, changes the top surface to give us a frosted appearance, which again is undesirable in this type of product.

Q. Could you state in your own words what—divorced from the technicalities of claim language—what you consider to be a description of the invention in issue? A. I feel that I have an engraving plate which is used for reproducing images by printing process, such plate comprising a sheet of deformable and soluble plastic, such as cellulose nitrate, and the surfaces being finished, such as by polishing, and one surface of which is treated with a mixture of a dye and a solvent, which are both—a dye and solvent for the plastic and for the dye.

For example, if the sheet were cellulose nitrate, we
would use the 95 per cent methyl alcohol, plus two-
28 tenths per cent methyl violet in the alcohol solution.

Now, it is also important that the treated surface must retain the original physical characteristics of that finished surface, and it is also important that the surface be tinted to a depth which is less than the minimum penetration of the stylus. For example, about a ten-thousandth of an inch.

Mr. Dodds: If Your Honor please, Mr. Stradar will also refer to the prior art. I think it will be helpful if we could defer that part of his testimony until one of the other witnesses describes some of the actual plates here in suit, if I may do so.

The Court: All right.

Mr. Dodds: Perhaps counsel would like to cross-examine Mr. Stradar on this part of his testimony.

The Court: You may cross-examine him on this part of the testimony, or defer it until he has finished.

Mr. Cochran: I think I will do it now.

Cross Examination

By Mr. Cochran:

Q. Did I understand you to say, Mr. Stradar, that it was a colored plate that was desired by the art, that people in the art were used to it, so that the engraving would supply, a positive image—was that your testimony? A. Not direct-
ly, sir. I said there was a psychological advantage in
29 having a colored plate, inasmuch as the trade was
used to that color. That was not the prime purpose
of my problem.

Q. And that the plate had been used in this process heretofore and was a transparent plate? A. That is correct, sir.

Q. So your problem essentially, then, was to incorporate a tint in the plastic plate? A. Not in it, sir, no—on one surface, to a limited depth of penetration.

Q. That was your problem? A. That is correct.

Q. Now, what were the requirements, again, just briefly? You mentioned burning rate? A. Yes.

Q. Did that refer to the base material? A. That referred to the base material, such as the cellulose nitrate.

Q. And product of decomposition? A. Yes. That is important from an oxidizing standpoint.

Q. Is there anything else? A. The most important being the depth or the control of the depth of penetration of the tinted surface, so that when the dot was removed by the
heated stylus, a contrasting color would appear.

30 Q. That is an essential part of your invention;
is that correct? A. Yes.

Q. How does that find itself into claim 1 of your application?

Mr. Dodds: I object. I don't think the witness is qualified to construe the claims of the application. That is a matter of law, as to how the claims are to be construed, I think, whether it can be construed in the light of the specifications or construed literally.

Mr. Cochran: I always assumed that claims were meant to inform the art as to what was marked out as invention to those skilled in the art.

Mr. Dodds: I don't think it is proper for the inventor to give that construction of the claim.

Mr. Cochran: I think the claim will stand on its own, then.

The Court: Very well.

My understanding was that the inventor would always interpret, give his interpretation, but ultimately the problem is for the Court.

By: Mr. Cochran:

Q. Now, you mentioned the dye mixture as being a critical matter? A. Yes, I did.

31 Q. The concentration of the dye in the solvent? A. Yes.

Q. Now, what are the limits of concentration that you feel are critical? A. Well, the limit should be between one-tenth of one per cent, to five-tenths of one per cent.

We find what we consider an ideal condition is two-tenths of one per cent.

Q. And we can assume then that concentrations outside of that limit are inoperative? A. Yes, that is correct.

Direct examination——(resumed)

By Mr. Dodds:

Q. With respect to the concentration limits about which you have just been asked, are those numbers which you gave, one-tenth of one per cent, to five-tenths of one percent, are those general for various dyes and various solvents, or are those proper limits for the specific example of methyl alcohol and the methyl violet? A. Methyl alcohol and methyl violet, the combinations which were then used and currently used; however, other dyes have been used. I don't know how to qualify the question.

Q. The question was: Would the same range, which you consider a critical range, apply if you were using different solvents and dyes rather than the methyl alcohol and
32 methyl violet dye? A. No. They would be probably
different. The concentrations would probably differ.

Mr. Dodds: I should like to call Mr. Hancock as the second witness.

(The witness left the stand.)

Thereupon

John R. Hancock

was called as a witness by counsel for Plaintiff and, having been first duly sworn, was examined, and testified as follows:

Direct Examination

By Mr. Dodds:

Q. Mr. Hancock, will you please state your full name, residence, and occupation? A. John R. Hancock, living at 118 Wyatt Road, Garden City, and I am assistant manager of the engineering department for Fairchild Graphic Equipment.

Q. Will you relate briefly your experience in the engraving field? A. My first experience dates back to 1931, at which time I started working with Walter Howey, who was at that time trying to develop a photoelectric engraver machine. I worked with Mr. Howey continuously on the photoelectric engraver machine through 1937, at which time Fairchild bought the Howey patents.

33 From 1937 on, until World War II started, I kept
in contact with Fairchild, who was at that time developing a machine of their own.

After the war, in 1950, I went with Fairchild, and have been working on the engraver since.

Q. Mr. Hancock, I show you a photograph and ask you if you can identify it? A. This is a photoelectric engraver, called a Scanagraver, produced by Fairchild.

Mr. Dodds: I would like to offer in evidence as Plaintiff's Exhibit 3 the photograph which the witness has identified.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 3 was received in evidence.)

Mr. Dodds: The only purpose of that is to show the nature of the machine we are talking about.

By Mr. Dodds:

Q. And I show you a plastic plate and ask you if you can tell us what that is? A. This is an engraving plate as produced by Fairchild for printing.

Q. What is it? A. Cellulose nitrate.

34 Q. Thank you.

Mr. Dodds: I offer in evidence as Plaintiff's Exhibit 4 the plastic plate which has been identified.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 4 was received in evidence.)

By Mr. Dodds:

Q. I show you another plastic plate and ask if you can identify that? A. It is the same type of plate, but it has been blue tinted.

Q. I think you said blue tinted? A. That is right.

Mr. Dodds: I would like to offer as Plaintiff's Exhibit 5, which is a tinted plate, in evidence.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 5 was received in evidence.)

By Mr. Dodds:

Q. I show you another plastic plate and ask if you can identify what that is? A. That is an engraving produced on the Scanagraver, on clear plastic.

35 Mr. Dodds: I will offer as Plaintiff's Exhibit No. 6 the plastic plate identified by the witness.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 6 was received in evidence.)

By Mr. Dodds:

Q. Will you explain just what is this sheet that you identified, what was prepared, and the backing on it, and why that backing was applied? A. This is an engraving as produced on the Scanagraver, it is a reproduction, one to one, and becomes a letter press printing plate. The backing that is applied is one to simulate what one would see on the engraving cylinder, and what one would see when the cut is mounted to a metal plate to be used in regular printing.

Q. I show you another plastic plate and ask you if you can identify this? A. This is the same as the clear one, except that the plate has been blue tinted before engraving.

Mr. Dodds: I offer as Plaintiff's Exhibit No. 7 the plastic plate which the witness has identified.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 7 was received in evidence.)

36 By Mr. Dodds:

Q. Is the backing on this plate, Plaintiff's Exhibit 7, the same or different from the one on the first plate, Exhibit No. 6? A. It is the same as on the first.

Q. And can you point out any defects in these plates, either or both of them? A. There are defects in both of them; on the blue one it is quite obvious. You can see a dark line running across the President's face. A similar line runs across the clear one.

Q. Will you identify the numbers and the exhibits as you mention them? A. I think it would be quite difficult to pick out the defect without close examination on Exhibit 6, but it is very easy to see on Exhibit 7.

The Court: Will you please point to the dark line?

The Witness: Yes, sir. This line here (indicating), running right across here.

The Court: Yes. And it is not so pronounced on mine, is it?

The Witness: It may not be. Yours happens to be a little different. You see where it runs, right here? These are different plates.

By Mr. Dodds:

37 Q. Mr. Hancock, I show you a proof, and ask you if you can identify that? A. That is a proof made from a plate, made on the Scanagraver.

Q. What is the relationship, if any, between the plate from which this proof is made, and the plates of Plaintiff's Exhibits 6 and 7? A. This plate is made from the same original copy, but there is no defect.

Mr. Dodds: I should like to offer in evidence as Plaintiff's Exhibit No. 8 the proof which witness has identified.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 8 was received in evidence.)

By Mr. Dodds:

Q. Will you tell me why a proof was made from a plate different from Plaintiff's Exhibits 6 and 7? A. Well, if we had made a proof from the plates which we offered as exhibits, they would have become smudged with ink, and would not have pointed out what we are trying to show, inasmuch as the background would have been somewhat filled with ink, and be discolored slightly.

38 Q. Mr. Hancock, you have had considerable experience with the Fairchild engraving machine in making these plastic engraving plates? A. Yes, I have.

Q. Can you say what is the relative ease of adjusting the machine in use, with a clear plate, and a tinted plate? A. Well, with a clear plate it is quite difficult, and one has to depend considerably on meter readings rather than being able to make good judgment by sight; whereas, on the blue tinted material, it is quite easy to see the size of the dot itself, and therefore be able to set up proper limits.

Q. I am not sure whether it is—

Mr. Dodds: First, let me offer a small microscope to Your Honor, which you may lay flat on the print and you can see the dot in the light portions and in the dark portions of the clear and the tinted plates.

The Witness: I think I would like to point out, if I may at this time, that although you are viewing these now with a glass, actually, when this is rotating it is more difficult than what we are seeing now.

By Mr. Dodds:

Q. Will you describe how you view these sheets to adjust the machine in normal practice? A. We use a microscope with a stroboscopic light.

39 Q. What is stroboscopic light source? A. That is a light flashing on and off, and in this case, it is synchronized to the movement of the stylus. The same energy, or part of the same energy which would operate the stylus is also used to operate the light source. So that when you look at it, it appears to stand still. This is a big help in viewing it, of course.

Q. That is all.

Mr. Cochran: I have no cross-examination.

(The witness left the stand.)

Mr. Dodds: Our next witness is Mr. Shivers.

Thereupon

Howard F. Shivers

was called as a witness by counsel for the Plaintiff, and having first been duly sworn, was examined and testified as follows:

Direct Examination

By Mr. Dodds:

Q. Mr. Shivers, will you state your full name, residence, and occupation? A. My name is Howard F. Shivers, 206 South Browning Road, Merchantville, New Jersey.

Q. I think it would be helpful if you could speak up a little louder. A. I am the art director for the Courier Post newspapers at the present time. I have been with them for nine years. Prior to that I was in charge of the combined Philadelphia Record, Sunday and daily newspapers, and the Evening Couriers and the Morning Post in Camden. Prior to that, I was in charge of the Evening Courier and Morning Post in Camden.

Q. What experience, if any, have you had in the cutting of plastic engraving plates with the Fairchild engraving machine? A. We have had the engraving machine since the days of the clear plastic.

Q. What time or year was that? A. 1949 or '50, somewhere around there.

I have made engravings myself on clear and tinted plastic. We have an operator that is responsible for most of that, but an assistant and I also help out.

Q. What, if anything, have you met in the way of difficulties in making engraving plates on the clear plastic engraving plate of Plaintiff's Exhibit No. 6? A. In order to make an engraving, we had to set the black and white levels on the engraving machine. The clear plastic was very difficult to see the size dot structure.

Q. And did you, in your experience with your publishing concern, encounter any mistakes in printing of engravings made with clear plastic plate, and, if so, what types? A.

During that period of a year or a year and a half, we had
several engravings appear upside down in the news-
41 paper.

Q. What was the general quality of the engravings made with a clear plastic plate? A. It was hard to tell what the quality was going to be until it appeared in the paper. Just to look at the clear plastic plate, it looked very similar to a frosted glass.

Q. Did you have any difficulties, and, if so, what, with your operators of the machines when they were using clear plastic plates? A. Well, during that period we did have trouble holding our operators. They were blamed for the poor quality of the engravings.

Q. When you speak of the poor quality of the engraving, would that relate to, say, a misadjustment of the machine, or to a poor picture from which you started, or both? A. It was definitely the adjustment of the machine. You could not see it clear enough to get the proper size dots in the level settings.

Q. Have you operated with the tinted plates of Plaintiff's Exhibit No. 5 at all? A. Yes, we have.

Q. And how long have you used those plates in your operation? A. Ever since they have been put on the market.

Q. What has been your experience with them? A.
Well, it has eliminated, and we have never had any
42 problems with the photographs getting in upside
down since then. It is a clear short dot, the surface, since it is tinted dark blue, when the stylus cuts through it, you see the clear plastic surrounding the blue dot, if it is a high-light dot. If it is a shadow dot, you see just the clear plastic dot, very small, surrounding clearly by the blue print surface.

Q. What was the relative ease or difficulty of adjusting a machine with the tinted plates as compared to the clear plates? A. I don't think I understand you.

Q. Well, you mentioned in using the clear plates that sometimes you had poorer quality picture, because of difficulty in properly adjusting the black level and the white level. I would like to know what effect did the use of the tinted plates have on that experience? A. Well, in the first place, I have explained that it is easier to adjust the machine. In the second place, when the engraving is finished, it has a clear, positive photo image and there is no doubt about whether it is good or bad. You know, even without proofing it, whether you have a good cut or a poor cut.

Q. And what, if any, effect, did the use of the tinted plate have on other errors? A. There has been no more upside down pictures in the paper. 43

Q. What effect did the use of the tinted plates have on remakes on poor quality pictures? A. They had been cut down to a minimum, and, incidentally, the operator that started with us when we got the blue tinted plastic, is still with us. We haven't had any turnover of operators in that time.

Q. How long a period was that, Mr. Shivers? A. That has been five years, or five and a half years.

Q. That is all.

Mr. Cochran: No cross-examination.

(The witness left the stand.)

Mr. Dodds: My next witness is Mr. Hyatt.

Thereupon

Judson Hyatt

was called as a witness by counsel for Plaintiff and, having been first duly sworn, was examined, and testified as follows:

Direct Examination

By Mr. Dodds:

Q. Will you state your name, residence, and occupation? A. Judson Hyatt; address is 238 Terrian Road, West Norwich, New York.

Q. And your occupation? A. I am general manager of the graphic equipment division of Fairchild Camera and Instrument Corporation.

44 Q. In what capacity, what cognizance do you have of sales and relations with customers of Fairchild? A. In the capacity of general manager—well, the general sales manager of this division is directly responsible to me, and inasmuch as this is the larger function in our particular division, there is quite a bit of concern about it, yes.

Q. In other words, you are saying that you have close familarity with the sales activities and relationship with customers? A. This is not only true now, Mr. Dodds, but prior to my present position I was general sales manager.

Q. Can you tell me from your position, from the sales point of view, what the effect the use of the tinted plate has on your relations with your customers? A. Well, when you read a number of reports from field personnel, both sales and service, they concern themselves with customer problems arising from this particular difficulty that has been described here in a number of ways and a number of places, and a number of customers; you realize it was a very serious sales problem from our standpoint. And its correction was a major accomplishment in the healthy growth of our operation.

Q. During the period of time that you used the clear plastic plates, were your customers completely satisfied with those plates? A. They were not, no. 45

Q. Did they register any complaints? A. Yes, they did, to our field representatives, as well as to other people on other occasions.

Q. I would like to show you a letter, and see if you identify this. A. This is a letter from a customer of ours, the Grand Rapids Press, of Grand Rapids, Michigan.

Q. Does he discuss in any way the problem to which you have referred? A. Yes. This customer in the letter refers to problems of proofing. Without reading the whole letter, I can say that before we had a tinting on here so you could easily and accurately see the image it was always necessary to proof the cut, in order to determine the quality of the engraving.

And many of our customers, small newspapers around the country, they had no proofing presses and they had to rely upon the final press run before they knew the quality of the engraving. With the advent of the tinted plastic, this whole problem was removed.

Mr. Dodds: I should like to offer in evidence the letter which the witness has referred to, as Plaintiff's Exhibit No. 9.

46 Mr. Cochran: If Your Honor please, I raise no objection, but I would point out that—I raise no objection, with the understanding that counsel and I have reached agreement as to this particular letter going to prove that there was a problem in the art, and that is the purpose for which it is introduced. It is technically objectionable as hearsay.

The Court: Yes. (Plaintiff's Exhibit 9 received in evidence.)

Mr. Dodds: That is correct, and I appreciate the indulgence of counsel in permitting its use for that purpose.

By Mr. Dodds:

Q. I also show you a letter and ask you if you can identify this letter? A. This is a letter from the Star Beacon, a publication of a printing company, of Ashtabula, Ohio, another one of our customers. In the letter, the author and co-publisher, Mr. Rowley, points out the desirability of this new colored plate material, as he calls it.

Mr. Dodds: I should like to offer in evidence as Plaintiff's Exhibit 10, the letter identified by the witness.

Mr. Cochran: No objection.

The Court: Received.

(Plaintiff's Exhibit No. 10 was received in evidence.)

By Mr. Dodds:

47 Q. I call your attention now to a publication, entitled "Editor and Publisher," and ask if you can identify that as to what it is, and what portion of it, if any, is relevant to the subject we are talking about? A. The publication "Editor and Publisher" is the major trade publication of the daily newspaper industry, or business, whatever you call it, in the United States. It is a weekly publication, and this is an excerpt from their issue of February the 11th, 1950. On the third column, about two-thirds of the way down, there is a paragraph—should I read it?

Q. I think it might be helpful? A. I am quoting:

"Then some of the pictures began coming out upside down in the paper, and it was found that after the stereos stuck the double-sided type on the plastic, it was hard for them to tell the top from the bottom. This was solved by having the desk mark on it with a grease pencil and arrow pointing to top of picture, page number, and guide line—" And then it goes on to say:

"All of this kind of nuisance has been eliminated by the tinted plastic."

Mr. Dodds: I would like to offer in evidence as Plaintiff's Exhibit 11 this publication.

Mr. Cochran: No objection.

The Court: Received.

48 (Plaintiff's Exhibit No. 11 was received in evidence.)

By Mr. Dodds:

Q. The date of this editorial and publisher's article appears to be February the 11th, 1950. Can you tell us whether or not there were any substantial sales of tinted plates prior to that time? A. There were not.

Q. I show you a pamphlet entitled "Impressions," and ask you if you can identify that? A. That is a copy of a quarterly publication issued by our company, to all of our customers and other members of the trade, which were interested for the purpose of encouraging the increased use of photography for photo journalistic purposes in these publications.

Q. And how are the pictures appearing in that publication, how are they reproduced? A. I haven't gone through every one of these, but, by and large, all of the photographs in these publications are regularly made on our machine.

Mr. Dodds: I should like to offer in evidence as Plaintiff's Exhibit No. 12 the photograph to which the witness has referred.

Mr. Cochran: No objection.

The Court: Received.

49 (Plaintiff's Exhibit No. 12 was received in evidence.)

By Mr. Dodds:

Q. Now, I might say that there is in the file wrapper of Exhibit 1, in the file of affidavits, a record of the sales of these plates, looking toward commercial success, up to the year of 1952, and I would like to bring that up to date, so I would like to ask you if you can give us approximately the sales figures on these tinted engraving plates for the years 1953, '54 and '55? A. In the year 1953, the sales volume of the tinted material was about $1,065,000. In the year 1954, $1,302,600, and in 1955, $1,484,800.

Q. And in the approximate six-year period since they were introduced, what was the total sales aggregate, approximately? A. Of the tinted material, or of the nontinted, or both?

Q. Just of the tinted material. A. Just of the tinted material, $5,344,900, is our total.

Q. That is all I have of this witness.

Mr. Cochran: No cross-examination.

(The witness left the stand.)

Mr. Dodds: In that case, I would like to recall Mr.
50 Stradar.

The Court: Very well.

Thereupon

George F. Stradar

was recalled as a witness by counsel for Plaintiff and, having been previously duly sworn, was examined and testified further as follows:

Direct examination—(resumed)

By Mr. Dodds:

Q. Do you have a copy of the two Hickman patents, which have been mentioned in this case, No. 1,900,877, and 1,957,888? A. Yes, sir, I do.

Q. Will you turn to the earlier Hickman patent, and describe briefly the subject matter of that patent. A. You want me to describe it?

Q. If you would, just briefly, summarize the disclosure of that patent. A. Mr. Hickman has a problem of correcting what is known in the photographic field, I believe, as halation. And halation is described, although I am certainly not expert in photographic films, as a shadow image or an outline over and above that as originally formed on a photographic negative.

Q. Excuse me. Doesn't the word actually come
51 from halo, such as around the moon? A. Yes.

The Court: I thought of high light.

Mr. Dodds: I think it comes from the word "halo."

By Mr. Dodds:

Q. Now, will you continue? A. In order to minimize this halation as much as possible, it is apparent in the photographic art that light bands to which the film is abnormally sensitive may be absorbed by the incorporation of a dye or some kind of spectral barrier to these wavelengths of particular nature. Mr. Hickman has investigated the problem from that viewpoint.

Q. When you say wavelengths of particular character, you mean really what we think of as light of a particular color? A. Yes.

Mr. Hickman, however, is not interested in an engraving plate. The type of film which he is particularly disposed with is not suitable for an engraving plate.

Q. Could you describe briefly just what character of a treatment he gives his film? Does he describe that in his patent? A. Yes. If I may read it. I think it might—

Q. You might point out if it is a particular portion of the patent. A. On his patent, I believe in Figure 2,
52 you can see that the film has a layer—No. 2, which has no particular disclosed depth in its patent. It is certainly uncritical insofar as he is concerned, and in this patent he does tint it with a blue dye which he impregnates, or which he uses as the impregnant, a solvent comprising of acetone and methyl alcohol. And then the photographic layer overrides that, and that is in his disclosure No. 3.

So then we have this intermediate layer between one, the film base, and three, the film emulsion. The purpose of that being a halation barrier or a spectral barrier, or a means of absorbing the light, stray light of a particular wavelength.

Q. Does Hickman describe in his patent just how he develops that tinted layer? A. No, he does not.

Q. What does he say about it? Does he say anything about it? A. Yes. He said it is desirable that the halation may be remedied by incorporating on either side or in the body of the film support a blue dye.

Then, I believe it was pointed out in line 37 of the first page, also points out that it is desirable and shall not be necessary to bleach out the dyes in processing. Mr. Hickman makes no effort to control a depth of penetration of his dye, by his statement there that the entire body may be dyed, or it may be either or both sides.

53 Q. Will you refer to the portion beginning at line 93 of page 1, starting, "This may be applied," and

so forth? State whether or not that is a description of his method of tinting the plate. A. "Any of the well known means for the application of a dye. This may be applied on either side of support—" He meant by "any of the well known means of applying a solution."

Q. You might continue with the following sentence. A. "Solvent will penetrate the supports sufficiently to embody permanently the dye in the surface thereof, so that it will not be removed in the ordinary photographic processes, such as are employed in the continuous machines now customarily employed for motion picture purposes."

Q. Do you find any places in the patent, any description of the manner in which he applies this tinting to his film? A. No, I am afraid I don't, Mr. Dodds.

Q. You mentioned the fact that Hickman applied an emulsion coating over the tinting dye. Is that emulsion coating transparent? A. Yes.

Q. The photographic emulsion? A. I believe it is.
54 But I am not expert on photographic emulsions; I am sorry.

Q. Let me ask you this: Did you find in—or will you point out anything that you find in this Hickman patent which shows any concern for the physical properties of the surface of the treated film? A. I am afraid I can't. I haven't found anything where he specifically mentions that there is any importance whatsoever to the top surface or any substratum of the film.

Q. Is Mr. Hickman concerned primarily, say, with the light transmission properties of his film, or with the physical character of film itself? A. Mr. Hickman is considerably concerned with the light absorbing properties of the film, or the nature of the film which he puts on the photographic film, not with the physical properties thereof.

Q. Is there any discussion of the resulting character or the treated surface itself? A. No, I haven't found any.

Q. Is there any discussion in the Hickman patent as to the depth of penetration of this tinting that he applies?

A. No. The only references that I can see says it may be applied to either side or through the body. That does not produce critical limits.

Q. If it was treated throughout the body, would it be
suitable for an engraving plate to develop a contrast
55 between the engraved and unengraved portions? A.
Not in the method used by Fairchild Camera.

Q. Would you point out any description in Hickman patents which, had you had it before you when you were presented this problem by the Fairchild Company, would have led you to the invention here in issue? A. I am afraid that I can't.

Q. Then, will you turn to the other Hickman patent, No. 1,957,888?

The Court: Is there a difference in the chemicals used in it?

Mr. Dodds: I believe there is, Your Honor. They are, in part, the same and, in part, different. In the application here in issue, there are disclosed several combinations of solvents and dyes which may be used with different types of plastic plates. The plate which has been used here is cellulose nitrate, but there are other types of plastics which may be used, and different solvents dissolve different types of plastics, and in this Stradar application there are a number of plastics disclosed and their respective solvents and the dyes that can be used with those solvents.

The preferred embodiment, and the embodiment, I believe the only one which is specifically claimed, is the one
which Mr. Stradar described, cellulose nitrate plastic with
methyl alcohol and methyl violet dye. But in the
56 application there are disclosed others, as well.

The Court: And what did Hickman use?

Mr. Dodds: I will ask the witness. I believe Hickman first used an acetate film; is that correct, Mr. Stradar, in No. 1,957,888?

The Witness: The motion picture film is acetate.

By Mr. Dodds:

Q. That is a cellulose acetate? A. Yes, because of the nitrate being flammable.

Mr. Dodds: The first Hickman patent, Your Honor, used a mixture, and I believe Mr. Stradar mentioned that a mixture of an acetone and methyl alcohol before. He doesn't state the concentration, as Mr. Stradar pointed out, is very important to prevent the softening of the surface.

Of course, Mr. Hickman wasn't concerned with that, and he doesn't specify, I don't believe, the percentage. He does mention the concentration of the dye which comes out not too different than what Mr. Stradar uses, a concentration of dye of two and a half per thousand, and we said approximately two-tenths of a per cent, which is very similar.

He does not mention, I believe, the identical dye; I am not sure that that, however, is really important. There are a number of these so-called organic dyes which can be used.

By Mr. Dodds:

57 Q. Now, will you continue with the second Hickman patent and describe briefly the invention disclosed in that patent? A. Again, Mr. Hickman is concerned with the process for reducing anti—or reducing halation in motion picture film. And he goes through three steps in order to produce this kind of halation area. One is a hydrolysis, whereby he immerses the film in an alkaline solution which, in turn, chemically converts the surface.

The second step is what is known as mordanting. And mordant is the name for a chemical which has the power of absorbing dye, and the mordanting step uses either tannic acid, potassium permanganate, copper ferrocyanide, or many which are known to the chemical profession.

His third step consists of dyeing or producing precipitation of a color or pigment on the mordanted surface, and he does that by using, as he says, preferably, an aqueous solution of a dye, and subsequent operations would be the drying and storing of this film.

Now, Mr. Hickman also makes mention of the fact that this water precipitated dye is fugitive. In other words, it can be washed off in water.

We feel that is a contradiction to what we need in an engraving plate. Also, because of his first step of hydrolysis, and second stop of mordanting the top surface of that
material, it would be roughened and chemically
58 changed, another thing incompatible with what we
consider necessary for an engraving plate.

I cannot estimate to what depth of penetration he might arrive. I believe he makes no specific mention of penetration. We are concerned with 1/10,000 of an inch, or less.

Now, I don't believe that inasmuch as Mr. Hickman is concerned with solving an optical problem, that I, as a chemist, would have gotten much value from this particular reference had I been faced with the problem of presenting and perfecting an engraving sheet.

Q. Would the mordanting of the surface of the film have any effect on the clarity of the engraving, if that were applied to engraving plate? A. Yes, the mordant is usually, and in this case it would be, loosely adherent precipitate. Anything like that used on the Fairchild scanograver would clog the advance shoe and also clog any prior dots engraved before the advance shoe ran over it.

Q. I should like to read to you, Mr. Stradar, a couple of sentences from the second paragraph of this patent, which was referred to by the Board of Appeals in its decision, which reads as follows:

> "It has been common practice to dye film by solution of
> dyes in organic liquids which carry the dyes into the
> 59 body of the film. The liquid usually being a partial
> solvent for the film base, as well as for the dye. These
> dyes are usually applied after the process of film forming by a series of rolls which transfer the dye to one side of the film. This dyeing may be accomplished, of course, by immersing the film or running it through a dye bath, but usually it is desired to dye but one side of the film."

And what I would like to ask you is whether you find in that statement any disclosure as to the particular concentrations or mixtures of the composition which is to be used? A. No, I don't.

Q. Do you find in that portion of the patent any discussion or disclosure of the depth of penetration of the tinting material? A. No.

Q. Do you find in that portion of the specification any reference to the character of the surface of the film after treatment? A. No, to the physical characters, no.

Q. Mr. Stradar, did you attempt to obtain a sample of film of the type described in the Hickman patents? A. Yes, I did. Mr. Smithers was requested to obtain that.

Q. Were you able to obtain a sample? A. No, we
60 were not.

Q. I would like to show you a sample of film, and ask you to identify it, please? A. This is a piece of 35-millimeter motion picture film, and do you want any further description?

Q. Is this in any way related to what Mr. Hickman is talking about? A. It is only related in principle, that he, too, speaks of motion picture film. This is motion picture film.

Q. Is this of anti-halation— A. Yes, it is. The underside of the yellowish color is the emulsion side, and if you notice, it differs from the shiny surface which is the film base. I cannot determine whether this is a coating giving it anti-halation, or whether is complete impregnation.

Q. Is this some special film or standard commercial film of this type? A. I believe the majority of film is anti-halation today.

Q. Is this film general commercial type, or some special type? A. Commercial type.

Mr. Dodds: I should like to offer in evidence as Plaintiff's Exhibit No. 13 the film identified by the witness.

Mr. Cochran: No objection.

61 The Court: Received.

(Plaintiff's Exhibit No. 13 was received in evidence.)

Mr. Dodds: I believe that is all I have.

Cross examination

By Mr. Cochran:

Q. Mr. Stradar, would you agree that you are generally in the graphic arts field in your work? A. I—no, not generally.

Q. Why would that be incorrect? A. Because, sir, I am a chemist, a metallurgist, and concerned with the raw materials of the plant, and if graphic arts is a part of the things we manufacture, why, then, I am a part of it, but not primarily as such. I service many divisions of the company, sir.

Q. Your company is concerned with graphic arts? A. That is true.

Q. And you handle those products? A. That is correct.

Q. In that work, wouldn't one in your position have the general knowledge of the products, which are used in photography? A. Generally so, yes.

Q. For instance, you would be familiar with the fact that
photography has used thermoplastic base materials
62 which have been tinted? A. I would be familiar
with the fact that they are thermoplastic base materials.

Q. You weren't familiar with the fact that they had halation coating on films? A. I was familiar with the fact that halation coating was on dry plates, not on film, until I dug into the problem, which was rather recently so, as a matter of fact, when the Hickman patent was cited.

Q. But you agree that one doing research in graphic arts generally would have knowledge of photographic products, or should be charged with the knowledge? A. That is true; yes.

Q. Now, you have testified at length as to the criticality of the depth of the coating on your product; is that right? A. That is true.

Q. Is there a particular depth which you can say is beyond the compass of your invention? A. I don't quite—would you repeat that, please?

Q. Did I understand you to say that your invention was limited to dye coatings, or dye impregnations, to a depth of one ten-thousandth of an inch? A. That is correct. One ten-thousandth or less, we might say.

63 Q. Would you say a greater depth than that would be inoperative for your purpose, then? A. It would be inoperative insofar as the full quality could not be obtained, that is, from the final engraved plate.

Q. Now, in refusing to allow your claim, the Board of Appeals said this:

"We are unimpressed"—

The Court: Where is that?

Mr. Cochran: This is on page 5 of paper E of the Defendant's exhibit, in the middle of the page.

"We are unimpressed by these arguments, because appellant is overlooking the process in the film disclosed in the Hickman patent, which the Examiner is relying on to negative invention in the claims. As indicated in our description of the Hickmant patent, they disclose quite clearly that a photographic film which is tinted on one side, in precisely the manner in which the appellant tints the plastic material, which constitutes his engraving plate, is old."

By Mr. Cochran:

Q. Now, is it your testimony that that statement is incorrect?

Mr. Dodds: I would object. That is not proper cross-examination. This witness hasn't testified about the ruling of the Board of Appeals.

64 Secondly, I think the decision of the Board of Appeals is a legal opinion, which this witness hasn't been shown competent to testify about, but principally, it is outside of the scope of direct examination.

Mr. Cochran: Perhaps I should lay a better foundation.

The Court: Certainly, the latter part, the technical part of your objection, is well taken. It is beyond the direct examination. He did not lead this witness into that field of the interpretation, but it seems to me it goes to the issue here, and—

Mr. Dodds: The way the question is phrased, whether he asked if his testimony—whether that statement is or is not true, I don't believe the witness has ever seen the statement.

Mr. Cochran: I just gave him the statement. But I will lay a better foundation.

The Court: Very well. Put the question in a different way, but it is pretty close to the $64 question in this case.

By Mr. Cochran:

Q. Is it your testimony that Hickman patent No. 1,900,877 does not disclose a complete process of dyeing the photographic film ? A. I would say he discloses, but he does not describe.

Q. What is the difference between disclose and describe? A. If I say to you that I dyed this, I didn't tell you how I dyed it. One is disclosure, the other is description.

65 Q. In what way is this description lacking in being a complete description? A. In what way is it lacking?

Q. Yes. I am referring particularly now to the portion which you read, beginning on line 93, of page 1 of the patent disclosure.

Mr. Dodds: Which patent?

Mr. Cochran: I just referred to patent 1,900,877.

By Mr. Cochran:

Q. It calls for—reading from line 89—will you read that? A. "Another example of a suitable mixture of dyes is given by a solution containing one part of fuchsine and one part of alphazurine in 200 parts of a solvent consisting of equal parts of methyl alcohol and acetone."

Do you want me to interpret that?

Q. No. I want you to go ahead with his process of coating, and tell me how his disclosure is lacking. A. "This may be applied on either side of the support during manufacture, employing any of the well-known means for the application of the dye. The solvent will penetrate the support sufficiently to embody permanently the dye in the surface thereof * * *."

Do you want me to read further?

66 Q. Well, go as far as you want. I am trying to find out what is lacking here in his disclosure. A. The "well-known means for the application of a dye" I don't understand. What is referred to there—

Q. That would not be known to one in the art? A. I am not in that art, sir.

Q. Well, in the coating of a dye on a surface— A. Yes, I suppose I would have to agree that one in the art would be familiar with the process of dyeing, either by dipping or perhaps roller-coating.

Q. What does your application have to say about that? Describe your dyeing process.

Reading from your own application, you state the plastic material may be treated with a solvent and dye mixture manually, by brushing it on lightly, or may be applied by means of conventional roller coat or gluing machine.

Now, that is essentially no more complete than his disclosure is to the process of coating—

Mr. Dodds: I object. If he is going to read that, he should read the following sentence, which states that applicant has obtained satisfactory results by using—

Mr. Cochran: Yes, I have read that.

By Mr. Cochran:

67 Q. That machine disclosed is a conventional roller or gluing machine? A. That is correct, yes, commercial item.

Q. You still contend that the disclosure here of the process of coating is incomplete in this patent? A. I am afraid I do; yes, sir.

Q. In what way? A. Again, it says an equal part of methyl alcohol and acetone—which is the composition of 200 parts of the solvent, and one part of the fuchsine and one part of alphazurine. I am afraid Mr. Hickman does not tell too much about how deep it will penetrate. He does say that it could be applied by any of the well-known methods of application for the dye, that is true. I have to agree with that, but I don't think that from this I could make an engraving sheet or engraving plate suitable for the process which we describe, where the depth of penetration is critical.

Q. So, it is the depth of penetration that is the part that is lacking in Hickman? A. That is one thing that is missing.

Q. What else is missing? A. He does not tell me what might happen to the top surface of the tinted sheet, whether or not we would have a softening effect, what effect it would have on the burning rate, what physical change or chemical change might occur in the surfaces of the nitrate. He doesn't mention that it is a nitrate film, or an acetate. I didn't see it here, sir.

68 Q. That all goes to whether or not this product which he produces would be effective for your purpose, doesn't it? It doesn't go to whether or not he discloses a process which can be carried out successfully; isn't that true? A. Well, he describes a process which can be carried out, yes.

Q. Now, going to the second patent, Hickman patent No. 1,957,888, you read the second paragraph in the patent on direct examination, did you not? A. No, I didn't read this.

Q. Will you read that paragraph and tell us what that paragraph means to you? A. The second paragraph?

Q. Yes. A. In 1,957,888?

Q. Yes, sir. A. All right.

"It has been common practice to dye film by applying solutions of dyes in organic liquids which carry the dyes into the body of the film, the liquid usually being a partial solvent for the film base as well as for the dye. These dyes are usually applied after the process of film forming by a series of rolls which transfer the dye to one side of the film. This dyeing may be accomplished, 69 of course, by immersing the film or running it through a dye bath, but usually it is desired to dye but one side of the film. Where a fugitive dye is required, as in applying color backings for motion picture positive film, leader strips or for anti-halation backings, this method has many disadvantages, since the dye is carried so far into the body of the film that it can usually not be removed easily, and can scarcely ever be removed quickly by water or the usual photographic baths.''

Further?

Q. No. That's all I wanted you to read.

Now, what does that mean to you, having in mind the rest of the patent with which you are familiar; does that indicate what has been done heretofore and what the rest of the patent describes is an improvement or departure from this? A. I think the rest of the patent describes the departure.

Q. Generally, that paragraph refers to the process which forms a subject matter of the earlier Hickman patent; isn't that so? A. This is postdating the Hickman patent, 1,900,-877.

Q. My question is whether the subject matter described there doesn't correspond generally to the description 70 in the earlier Hickman patent. A. It would generally describe it, yes.

Q. Actually, these two patents relate to two different things, one to fugitive coating, and one to non-fugitive coating? A. Not completely. It says the dye can be fugitive in this 888 patent.

Q. Isn't that the purpose of the patent, to make a fugitive coating? A. I don't think so, sir.

Q. Can you point out where he says that the intent to do something other than the fugitive coating? It was my impression that this was to produce a fugitive coating. Now, I might be wrong—

Mr. Dodds: I might call your attention to page 1, line 33, which is as follows:

"The tinted layer may be fugitive for the purpose of temporary backing, or it may be permanent, for the purposes for which such dyed film is usually employed."

By Mr. Cochran:

Q. The earlier patent was limited to a permanent tint; is that correct? A. I believe so.

Q. Whereas this may be permanent or non-permanent? A. Yes.

71 Q. Would you assume that the base stock used for photographic film had a finished surface? A. Will you tell me what you mean by "finished?"

Q. You define the term as you mean it in your claim. A. By "finishing," in my claim means a polishing, as opposed to what is known as the skived sheet, where the photographic film is made by an entirely different process, whereby there was no subsequent finishing, to the best of my knowledge, to the film, no.

Q. Well, it is finished, you would assume, to the extent that it is made as flat as possible by running it between rollers? A. I don't believe motion picture film is made that way.

Q. How is it made? A. It is known as a solvent evaporation method whereby a sheet of the mixture of the cellulose and acetate and solvent, the solvent is allowed to evaporate, leaving the thin film on a track or roller, forming it into a sheet.

That is entirely different than the process used for making the type of sheet which I am familiar with, as an engraving plate.

Q. Now, in summary, considering the tinted base material, used in the Hickman patent, that is, prior to its being coated with photographic emulsion, would you point out how that differs from your product?

72 Mr. Dodds: What was that?

Mr. Cochran: The product which is produced by the second paragraph in the later Hickman patent.

The Witness: You want me to point out how it differs to my—

By Mr. Cochran:

Q. I want to know how the product which I defined differs from yours. A. Well, let's take the first sentence:

"This invention relates to non-halation motion picture film, and in particular to the use therein of a permanent layer having light absorbing qualities in certain defined regions—"

Q. Now, this is the earlier patent you are reading from? A. This is the 1,900,877 patent.

Q. Is the later Hickman patent limited to motion picture film? A. Photographic film.

Q. All right. That is a distinction. Photographic film, as opposed to what was your device? A. An engraving plate.

Q. All right? A. Shall I continue?

Q. Yes A. I am not interested in the absorbing qualities of any part of the spectrum.

73 To continue, from Mr. Hickman:

"The usefulness of the invention which I will describe depends, first, on recent advances in the manufacture of sensitive photographic emulsion—"

Q. I am afraid you are getting into somethnig that is not responsive. I defined a particular product, the base material disclosed by Hickman, with a dye, prior to its being coated with the photographic emulsion.

Now, taking that product and comparing it with yours, what is the distinction? A. In the first place, Mr. Hickman uses the cellulose acetate—he does apply a dye by use of a solvent, which is mutual for both the dye and the base material. The solvents which he used are a mixture of acetone and methyl alcohol. Acetone and methyl alcohol in a process which I have considered would be harmful to the engraving plate. Mr. Hickman does make reference to some concentration of dye. He mentions there two and a half parts per thousand.

Q. Well, now, taking the solvent, you say there is a difference in the solvents that are used between your process of production and Hickman's process of production; that is a distinction? A. That is one distinction.

74 Q. In other words, it is your view that the specific solvent disclosed by Hickman would not be satisfactory for your purpose? A. It would be harmful; yes, sir.

Q. Let me ask you this: Would the mixture of methyl alcohol and acetone be inert chemically to the base material? A. You mean, would it be inert chemically to the base material?

Q. Yes. A. It would be inert chemically to the base material.

Q. So, you have a disclosed distinction, you feel, as to the type of solvent? A. Yes.

Q. I would take it, then, you would feel the type of solvent that is something critical to your invention that you can use only certain types of solvents? A. The one which is mutual to the dye and the plastic material, but also which would have to be adjusted so as not to cause the base material to be chemically reactive to it.

Q. Why—or rather, is that true of the Hickman type? A. Well, you didn't ask me that. You asked me would the solvent be reactive to the base. I am concerned about the base being reactive to the solvent.

75 Q. Would the base be reactive to the solvent, chemically? A. No.

Q. That isn't the Hickman process? A. No; the Stradar process.

Q. Is there anything further you want to add? A. No, sir.

Mr. Dodds: I have just a few more questions.

Redirect examination

By Mr. Dodds:

Q. Referring to the first Hickman patent, Mr. Stradar, when Mr. Cochran was asking you about the differences between the base sheet, described by Hickman, and your basic plastic engraving sheet, do you find in Hickman patent a disclosure of the concentration of the solvent—and I am not talking about the concentration of the dye, but concentration of the solvent? A. Mr. Hickman makes no mention in this one, which is 1,900,877, of the concentration of the solvent. He says a mixture of acetone and methyl, but I don't know how much of each. I find no reference to it.

Excuse me. There is one place he says here: "consisting of equal parts of methyl alcohol." Acetone is another example, 995.

Q. Are both acetone and methyl alcohol, to which he refers, ordinarily commercially available, chemically pure, without any water? A. They can be obtained that
76 way.

Q. Are they available ordinarily commercially that way, or are they ordinarily used commercially that way, without some water content? A. No, they are not.

Q. And is the water content important in its use for tinting an engraving plate? A. It would be important to me, yes.

Q. And again, referring to the same Hickman patent and portion quoted by Mr. Cochran, it refers to "well-known means for application of dye." Is dipping a well-known means for application of dyes? A. Well, if you are dyeing cloth, you would dip it.

Q. As a matter of fact, doesn't Mr. Hickman himself refer to dipping as one way of dyeing? A. Yes, but I can't find it for you at the moment.

Q. Well, then, the second Hickman patent, at page 1, about line 12, he says "immersing the film or running it through a dye bath." Is that equivalent to dipping? A. I would interpret it as such.

Q. Is dipping suitable for tinting an engraving plate? A. No, it is not.

Q. Then, referring to the second Hickman patent, 1,957,888, you mentioned that it was important that the solvent be a mutual solvent for the dye and the plastic plate? A. Yes. 77

Q. Is it important whether or not that mutual solvent softens the surface of the plate in the use of the engraving plate? A. It cannot soften it. If it does, then it is not suitable as an engraving plate.

Q. Does either the Hickman patents indicate whether or not there is any softening of the surface of the film by the treatment to the dye mixture? A. No, I can't find it.

Q. In the motion picture film or any photographic film, would a limited amount of softening of the surface have any effect on the suitability of the film for its intended purpose? A. No, not as a photograph record; no.

Q. Could the photographic film described in either of the Hickman patents, as described in these patents, could that be used for and as an engraving plate? A. No, it could not.

Q. That is all.

Recross examination

By Mr. Cochran:

Q. Would you agree that the second Hickman patent says that although dipping is one way, he prefers not to
78 use that way? A. I don't know if he prefers it, sir, but he makes reference to other methods.

The Court: Is there a great deal of difference in the chemical material, or chemical difference between an engraving plate and a photographic film, or is there a similarity?

Mr. Dodds: I am not sure I understand your question.

The Court: What is the difference, the basic difference, basic chemical structural difference between a photographic film and an engraving plate, such as you use in this case? Are they made of substantially the same material?

Mr. Dodds: Well, before treatment, except for the physical form, they may be the same. The photographic film, as Mr. Stradar testified, is usually acetate; however, the Stradar application states you may use that, too, but the preferred form has to be cellulose nitrate, but the raw material before treatment may be the same except for form. The film, of course, being a flimsy thing, and the engraving plate being something that is sufficiently rigid to be engraved on, but that is quite correct.

By Mr. Cochran:

Q. Counsel has questioned you as to the water content of commercially available methyl alcohol and acetone. Is that a critical matter on the operating of your process concerned? A. To this process, yes.

79 Q. Do you so state in your application? A. I don't know, frankly.

Q. You do disclose the use of methyl alcohol and acetone as solvents, do you not? A. It has been so long since I have looked at that, I am afraid I can't answer your question.

In this paragraph, or whatever you call it, we describe certain sheet materials which could be used for engraving plate, and also the solvents which might be used as dye carriers, in the adjacent column.

Q. My question is whether or not it disclosed acetone and methyl alcohol as solvents. A. Acetone and methyl alcohol is a mixture.

Q. Methyl alcohol is a solvent? A. Yes; for a specific base.

Q. Now, as to this matter of softening, in carrying out your process, isn't a temporary softening of the surface necessary in order to carry the dye to the proper depth into the base? A. Yes, you could call it a temporary softening.

Q. That is all.

The Court: And does your patent teach the means of limiting the depth that it is carried into the plate?

The Witness: Yes, sir.

Further redirect examination

By Mr. Dodds:

80 Q. With respect to the disclosure in your application—I guess it is in evidence, I don't have it. On page 5 of the specification it states the use of 95 per cent methyl alcohol. What does that 95 per cent methyl alcohol mean? A. That is commercially pure methyl alcohol. The 5 per cent is water.

Q. And further in your specifications—and I will read this part and see if it has any bearing on the question of the amount of water present:

"In treating a sheet of cellulose nitrate with a mixture of methyl alcohol and aniline dye, it has been found that a quart of mixture will treat from 20,000 to 200,000 square inches of the sheet material. This variation is apparently due to condensation of atmospheric moisture on the sheet and in the container of the coloring mixture due to cooling by the rapid evaporation of the solvent. This condensation increases as the temperature is lowered and as the humidity rises.

"Excessive condensation of atmospheric moisture impairs the character of the treated surface portion of the plastic sheet, softening it and rendering it susceptible to removal by the spacing shoe of the engraving machine, which usually contacts the engraving plate in advance of the engraving stylus.

81 "The presence of an excessive amount of moisture is manifested by what is termed 'blushing,' which appears to be a whitish precipitate."

Does that portion of the specifications I just read to you have anything to do with the question of how much water should be present in the solvent? A. Yes, it limits it to the commercial purity, which is 5 per cent in methyl alcohol.

Q. Mr. Cochran asked you about the disclosure of the use of acetone as a solvent in your application. I refer you to page 5, line 30, and ask you what type of a plastic acetone is described as solvent there? A. Ethyl cellulose ether.

Q. And would cellulose be suitable solvent for acetone nitrate? A. It would dissolve cellulose nitrate.

Q. That is all.

(The witness left the stand.)

The Court: Do you have other witnesses?

Mr. Dodds: No, sir.

The Court: Have you witnesses?

Mr. Cochran: No, I have no witnesses, but I would like to offer in evidence the folder which I handed up, as Defendant's Exhibit 1.

The Court: That has been received.

82 (Defendant's Exhibit No. 1 was received in evidence.)

* * * * * * * * * *

91 Filed June 15, 1956

MEMORANDUM BY THE COURT

WILKIN, *District Judge* (By Designation):

This action, instituted under Section 145 of Title 35, U. S. C., seeks judgment of this Court, authorizing the Commissioner of Patents to issue a patent on an application filed by George F. Stradar December 29, 1950, for an "Image-Engraving Plate and Process of Producing the Same."

The application contained 15 claims, 14 of which were rejected. This action seeks a direction to the Commissioner to issue a patent for the rejected claims (1-14, inclusive).

Some years ago the plaintiff, Fairchild Corporation introduced commercially its photoelectric engraver for producing plastic half-tone engraved plates as a substitute for the more costly zinc or copper photochemical half-tone plates. The plates initially furnished by the Fairchild Corporation for use in its engraving machine were of clear cellulose-nitrate plastic. The use of such clear plates gave rise to a number of difficulties. The plaintiff, Stradar, in order to obviate such difficulties devised and produced a tinted plastic plate, a sample of which is shown in Exhibit 5. The plaintiffs contend that the tinted plastic
92 plate overcame all the shortcomings of the clear plastic plate:

> "It eliminated errors in print (R. 41-43); it showed up any defects in the plate while the engraving was being made (R. 36, Exhibit 7); it facilitated adjustment of the engraving machine to set the black level and the white level of the picture (R. 42); and it eliminated operator difficulties arising from numerous remakes of pictures of poor quality (R. 43)."

The evidence was clear that the Stradar tinted plate was useful and became a commercial success. Witnesses who had used the Stradar plate told how the tinted plastic plates eliminated various troubles encountered in the commercial use of the former clear plates.

The Board of Appeals of the Patent Office rejected the first 14 claims on the ground that they were "structurally anticipated by the Hickman patents or are non-inventive thereover." (Nos. 1,900,877 and 1,957,888.) The Board held in addition that claims 10, 11 and 14 were defective because they set forth the extent of dye penetration in an indefinite manner.

The issues raised in this case are within the special competence of the officers of the Patent Office, and the case is therefore controlled by the presumption in favor of the determination by the Patent Office.

The record discloses that the Hickman patents describe an operable process of tinting a plastic sheet (Transcript, page 68, lines 5 and 6), and the Board held that claims 1 to 4 and 8, 9, 12, and 13 were effectively anticipated in a structural sense and were, therefore, unpatentable.

In re Laurent, 186 F. 2d 741;

93 *H. K. Regar & Sons, Inc.* v. *Scott & Williams, Inc.,* 63 F. 2d 229.

The Board held that the only difference between Hickman No. 1,900,877 and claims 5, 6, and 7 of the application in suit was the employment by the applicant of a solvent consisting almost wholly of methyl alcohol (95%) instead of 50% used by Hickman, and the Board held that distinction was not patentable. And the Board rejected claims 10, 11 and 14 because they disclose no particular depth of penetration of the dye and, therefore, failed to show a critical or inventive difference from Hickman.

The plaintiffs question the propriety or correctness of the Board's determination. As was said in the case of *Smith* v. *Kingsland,* 178 F. 2d 26:

> "This question being of a technical nature which the Patent Office is well equipped to decide, its conclusion as to patentability should not be disturbed if there is a rational basis for the decision."

Under rule established by that case, this Court can not set aside the decision of the Patent Office merely because its opinion differs from that of the Board of Appeals, unless it further finds that there was no rational basis for the Board's decision. Since the evidence reveals a reasonable basis for the determination of the Patent Office, judgment must be awarded for defendant.

Findings of fact, conclusions of law, and final order may be prepared and submitted by counsel for the defendant.

R. N. Wilkin,
U. S. District Judge.

Washington, D. C.,

June 15, 1956.

* * * * * * * * * *

94 Filed June 27, 1956

FINDINGS OF FACT

1. This is a proceeding under Section 145 of Title 35 of the United States Code in which the plaintiffs, George F. Stradar and Fairchild Camera and Instrument Corporation, sought to have the Court authorize the allowance of claims 1 to 14 of application for patent Serial No. 203,310, filed December 29, 1950. Claim 15 in the application was allowed by the Patent Office.

2. Claims 1 to 14 of the application in issue relate to a blank plastic engraving plate and its process of manufacture, the plate constituting an improvement over clear blank plates previously used in photoelectric engravers in that one side is impregnated with a dye to provide a visible image on the plate at the completion of the engraving operation. Claims 5, 6, and 7 are limited to the use of 95% methyl alcohol as a mutual solvent for the plastic base material and the dye. Claims 10 and 14 limit the penetration of the dye to a depth less than the maximum deformation encountered in engraving, while claim 11 specifies the penetration to be "of the order of 0.0001 inch."

95 3. The Hickman patents No. 1,900,877 and No. 1,957,888 show that it is old to impregnate one side of plastic photographic film base with a dye by ap-

plying to the base a solution of the dye in a solvent which is also a partial solvent for the base. In Hickman patent No. 1,900,877 the dye solution is disclosed as 2½ parts of a suitable dye in 1000 parts of a solvent consisting of equal parts methyl alcohol and acetone.

4. Aside from the reference in the preamble of each claim to an "engraving plate for reproducing images by printing processes," claims 1 to 4, 8, 9, 12 and 13 describe the tinted product disclosed by the Hickman patents and those claims are, therefore, effectively anticipated in a structural sense.

5. The evidence failed to establish any difference critical to an improved result in the use of a solvent consisting of 95% methyl alcohol instead of the solvent disclosed in the Hickman patent No. 1,900,877, and claims 5, 6 and 7, therefore, define nothing inventive over the Hickman patents.

6. Claims 10, 11 and 14 are indefinite in their reference to the depth of penetration of the dye in the base material and therefore, define nothing inventive over the Hickman patents.

7. Claims 1 to 14 do not define invention in view of the prior art.

* * * * * * * * * *

96 CONCLUSIONS OF LAW

1. The plaintiffs are not entitled to a patent containing any of claims 1 to 14 of application Serial No. 203,310.

2. The complaint should be dismissed.

R. N. Wilkin,
Judge.

Seen by:

Miles D. Pillars
Attorney for Plaintiffs

Date: June 26, 1956

97 Filed June 27, 1956

JUDGMENT

This action came on to be heard at this term, and thereupon upon consideration thereof, it is this 27th day of June, 1956

Adjudged that the complaint be and it is hereby dismissed, with costs against plaintiffs.

R. N. Wilkin,
Judge.

Approved as to Form:

Miles D. Pillars
Attorney for Plaintiffs

* * * * * * * * * *

98 Filed July 24, 1956

NOTICE OF APPEAL

Notice is hereby given that George F. Stradar and Fairchild Camera and Instrument Corporation, Plaintiffs above named, hereby appeal to the United States Court of Appeals for the District of Columbia from the final Judgment of the District Court entered in this Action on June 27, 1956.

Miles D. Pillars,
Attorney for Plaintiffs,
National Press Building,
Washington 4, D. C.

Laurence B. Dodds,
Counsel for Plaintiffs,
59-25 Little Neck Parkway,
Little Neck, N. Y.

Dated: July 24, 1956

Docket 221
(S-511)
LBD:PC

This invention relates to an engraving plate for reproducing images by printing processes and to a process of producing the same and, while it is of general application, it is particularly suitable for use in the machine for producing screened relief pattern image plates of the type described in the copending application of John A. Boyajean, Jr., Serial No. 40,594, filed July 24, 1948, and assigned to the same assignee as the present application.

In aforesaid copending application there is described a machine designed and intended to be used in the place of well-known photochemical processes for making plates from photographic prints, negatives, or other images for reproduction by printing or like processes. In general, that machine comprises a pair of synchronously rotatable cylinders for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a photoelectric pick-up system and a plate-deforming tool for respectively scanning the image sheet cylinder and the plate cylinder. The machine also includes means responsive to the output of the pick-up system for actuating the tool, means for reciprocating the carriages synchronously; and an electrical screen generator driven synchronously with the cylinders and connected to modulate the output of the pick-up system.

In the operation of a photoengraving machine such as described in aforesaid copending application, it is customary to use an image-reproducing plate comprising a flexible sheet of clear plastic material, such as cellulose nitrate, on which the image is formed as a screened relief pattern by a heated engraving stylus which is actuated by the photoelectric image-scanning device and which thermally decomposes the material of the plate to form the desired relief pattern for image reproduction. In such an operation it is difficult to determine from an inspection of the engraved plate the quality or character of the image formed thereon. At the same time, it would be highly desirable to be able to tell from a mere inspection both the quality of the reproduced image, such as its detail and depth, and also the general subject of the image, in order to facilitate filing and selection from the files for subsequent use.

It is an object of the present invention, therefore, to provide a new and improved engraving plate for reproducing images by printing processes from which, after engraving, the quality and character of the image formed thereon are readily revealed by a mere inspection.

It is another object of the invention to provide a new and improved engraving plate for reproducing images by printing processes in which the plate has a surface layer treated in such a manner that, after engraving, the quality and character of the image formed thereon are readily revealed by inspection.

It has been found that the f[illegible]ts can be achieved by treating the surface portion of the engraving plate in such a manner as to impart thereto a pronounced or contrasting color which, upon engraving, gives a marked contrast between the engraved surface and the body of the image plate and provides a clear indication of the quality and nature of the image engraved upon the plate.

In accordance with the invention, an engraving plate for reproducing images by printing processes comprises a sheet of deformable soluble plastic material having a surface portion treated with a mixture of a dye and a mutual solvent for the plastic material and the dye. By the term "printing processes", as used herein and in the appended claims, is meant any process by which a plate carrying a screened relief pattern may be utilized to produce multiple reproduced images, of which the most usual example is the conventional printing process. By the term "deformable material", as used herein and in the appended claims, is meant a material that may be cut, gouged, decomposed or otherwise deformed by an engraving tool or stylus to form an image-reproducing plate.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description taken in connection with the accompanying drawing, while its scope will be pointed out in the appended claims.

Referring now to the drawing, Fig. 1 is a perspective view of an image-engraving plate of the type to which the invention may be applied, while Fig. [illegible] is an enlarged cross-sectional fragmentary detail view of a portion of the plate of Fig. 1 to aid in an understanding of the invention.

Referring now more particularly to the drawing, a plate for reproducing images by printing processes as shown in Fig. 1 comprises a sheet 10 of deformable plastic material having preformed reversely bent end flanges 11 and 12 to aid in securing the plate to the appropriate

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supporting carriage of an engraving machine. The plate 10 has a surface portion treated with a mixture of a dye and a mutual solvent for the plastic material and the dye. This treated surface portion is shown more clearly in Fig. 2, which is very much enlarged and in which the thickness of the treated surface portion 10a is exaggerated for the sake of clarity. There are shown on the plate in Fig. 2 a series of deformations or pits 10b (which are exaggerated in size and spacing for the sake of clarity) such as might be formed by the engraving tool in engraving a single line across the image plate. As explained hereinafter, the treated surface portion 10a is of a color which contrasts sharply with the body of the image plate 10, which may be a clear transparent or colorless plastic. The deformations 10b show that the engraving tool, in forming the deformations 10b, has penetrated to a depth extending through the treated surface layer 10a. Therefore, these deformations 10b appear as small colorless dots in the colored surface layer 10a.

The image-engraving plate may be formed of any suitable plastic material such as a thermo-plastic resin, it only being necessary that it be a material soluble in a solvent for the coloring dye. By way of example, the plate 10 may be formed of a sheet of cellulose nitrate with an added plasticizer, for example, approximately 25% by weight of camphor. The plastic sheet may be formed in any conventional manner, for example, as described at pp.196-197 of "Modern Plastics Encyclopedia - 1948" Plastics Catalogue Corporation, New York. The surface portion 10a is treated with a mixture of a completely vaporizable solvent, for

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example, a lower aliphatic alcohol such as a methyl, ethyl, propyl, isopropyl or butyl alcohol and a dye soluble therein. One example which has been found eminently satisfactory is a mixture of 95% methyl alcohol and a spirit-soluble aniline dye, such as methyl violet (Color Index No. 680), the latter being in a concentration of the order of 0.2% and preferably within the range of 0.1% to 0.5% by weight of the solvent.

Among other materials suitable for forming the image-engraving plate of the invention are the following:

Sheet Material	Solvent
Polystyrene or Methyl methacrylate polymers	An ester - e.g. amyl, ethyl, or butyl acetate; a ketone - e.g. methyl ethyl ketone
Cellulose acetate Cellulose acetate butyrate	An alcohol - e.g. isopropyl, methyl or ethyl; a ketone - e.g. methyl ethyl ketone; an ester - amyl, ethyl, or butyl acetate
Vinyl chloride acetate polymers	An ester - e.g. amyl, ethyl, or butyl acetate; a ketone - e.g. methyl ethyl ketone; an alkylene halide - e.g. ethylene dichloride; an aromatic hydrocarbon - e.g. toluene
Ethyl cellulose ether	Acetone, benzene, toluene xylene, ethyl acetate

Among other spirit-soluble aniline dyes suitable for use with the materials and solvents listed in the preceding table may be mentioned the following, with their respective Color Index numbers: crystal violet (C.I.681), oil crimson (C.I. 258), pheno-safranine (C.I.840), neutral blue (C.I.832), aniline rose (C.I.841), and azine blue spirit soluble (C.I.860).

In forming the image-engraving sheet of the invention, the sheet 10 of plastic material may be treated with the solvent and dye mixture manually, brushing it on lightly, or it may be applied by means of a conventional roller coating or glueing machine. Applicant has obtained satisfactory results by using a commercial Pottdevin glueing machine with a [illegible] coating or inking roller dipping in a well of the solvent and dye mixture. If desired, there may be provided an idler roller adjustably spaced with respect to the inking roller in order to control the amount of mixture carried by the latter to the sheet.

The amount of the mixture applied to the sheet is not critical but is adjusted subjectively by the operator to get a desired degree of color saturation. The amount of mixture should be controlled so that it penetrates the surface of the sheet to a depth substantially less than the maximum deformation of the sheet during the engraving process, for example, to a depth of the order of 0.0001 inch. The exact amount of treating mixture can be best determined by experiment in the light of the foregoing criteria.

It has been found that the amount of the treating mixture required to treat a given surface area is affected by variations in atmospheric temperature and humidity. For example, in treating a sheet of cellulose nitrate with a mixture of methyl alcohol and aniline dye, it has been found that a quart of the mixture will treat from 20,000 to 200,000 square inches of the sheet material. This variation is apparently due to condensation of atmospheric moisture on the sheet and in the container of the coloring mixture due to cooling by the rapid evaporation of the solvent. This condensation increases as the temperature is lowered and as the humidity rises. Excessive condensation of atmospheric moisture impairs the character of the treated surface portion of the plastic sheet, softening it and rendering it susceptible to removal by the spacing shoe of the engraving machine, which usually contacts the engraving plate in advance of the engraving stylus. The presence of an excessive amount of moisture is manifested by what is termed "blushing", which appears to be a whitish precipitate formed by moisture absorbed by the temporarily softened plastic material. When such a phenomenon is observed, the treating mixture should be discarded and a fresh quantity prepared.

There are a number of characteristics and criteria characterizing the invention:

(1) The action of the solvent and dye mixture on the plastic sheet is purely a physical one involving no chemical reaction.

(2) The mixture thoroughly penetrates the surface portion or layer of the engraving plate and is to be contrasted with coatings adhering to the surface thereof which tend to be abraded or rubbed-off in handling or by the spacing shoe of the engraving machine.

(3) The engraving surface of the finished plate must be undamaged by any softening or chemical reaction with the treating mixture, in order to prevent abnormal deformation of the surface of the plate by the engraving tool.

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(4) The treating mixture preferably should leave no unabsorbed residue on the surface of the plate which will adhere to the engraved plate after engraving or fill in the engraved deformations. To this end, the dye should be completely soluble and the solvent should be completely vaporizable.

While there have been described what are at present considered to be the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

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WHAT IS CLAIMED IS:

1. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of deformable soluble
only one face thereof
" plastic material having a surface portion treated with a
mixture of a dye and a mutual solvent for the plastic
Insert a' material and the dye. a'

2. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of deformable soluble
only one face thereof
" thermoplastic resin having a surface portion treated with
a mixture of a dye and a mutual solvent for the thermo-
Insert a' plastic resin and the dye. a'

3. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of cellulose nitrate,
only one face thereof
" having a surface portion treated with a mixture of a dye
Insert a' and a mutual solvent for cellulose nitrate and the dye. a'

4. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of cellulose nitrate,
only one face thereof
" having a surface portion treated with a mixture of an
Insert a' alcohol and an alcohol-soluble dye. a'

5. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of cellulose nitrate,
only one face thereof
" having a surface portion treated with a mixture of
Insert a' approximately 95% methyl alcohol and an aniline dye. a'

6. An engraving plate for reproducing images by
finished-surface
a printing processes comprising: a sheet of cellulose nitrate,
only one face thereof
" having a surface portion treated with a mixture of approxi-
mately 95% methyl alcohol and an aniline dye in a concen-
Insert a' tration of the order of 0.2%. a'

7. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of cellulose nitrate, only one face thereof having a surface portion treated with a mixture of approximately 95% methyl alcohol and an aniline dye in a concentration in the range of 0.1% to 0.5%.

8. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of polystyrene, only one face thereof having a surface portion treated with a mixture of an acetate and an acetate-soluble dye.

9. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of methyl methacrylate polymer, only one face thereof having a surface portion treated with a mixture of an acetate and an acetate-soluble dye.

10. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of deformable soluble plastic material, only one face thereof having a surface portion treated to a depth less than the maximum deformation by engraving with a mixture of a dye and a mutual solvent for the plastic material and the dye.

11. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of deformable soluble plastic material, only one face thereof having a surface portion treated to a depth of the order of 0.0001 inch with a mixture of a dye and a mutual solvent for the plastic material and the dye.

12. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of deformable soluble plastic material, only one face thereof having a surface portion treated with a

mixture of a dye and a completely vaporizable mutual solvent for the plastic material and the dye. /a'

Insert a'

13. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of deformable soluble plastic material only one face thereof having a surface portion treated with a mixture of a dye and a mutual solvent for the plastic material and the dye, said solvent being chemically inert with respect to said plastic material and said dye. /a'

a

Insert a'

14. The process of producing a finished-surface ~~an~~ engraving plate for reproducing images by printing processes which comprises treating a surface portion of only one face of a deformable plastic material with a solution of a dye in a mutual solvent for the dye and the plastic material so as to impregnate the material with the dye to a depth less than the maximum deformation encountered in engraving while retaining substantially the original character of the finished surface.

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15. The process of producing an engraved plate for reproducing images by printing processes which comprises applying a heated engraving stylus, in a predetermined pattern, to a finished-surface sheet of deformable thermoplastic material only the engraving side thereof having a surface portion treated to a depth less than the maximum deformation encountered in engraving with a mixture of a dye and a co-solvent for the thermoplastic material and the dye. /a'

a

Insert a'

[redacted]

Oath, Power of [illegible]orney, and Petition

Being duly sworn, I, GEORGE F. STRADAR depose and say that I am a citizen of the United States residing at Mineola, County of Nassau, State of New York; that I have read the foregoing specification and claims and I verily believe I am the original, first, and sole inventor of the invention or discovery in

IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME

described and claimed therein; that I do not know and do not believe that this invention was ever known or used before my invention or discovery thereof, or patented or described in any printed publication in any country before my invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that this invention or discovery has not been patented in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months before this application; and that no application for patent on this invention or discovery has been filed by me or my representatives or assigns in any country foreign to the United States, except as follows: no exceptions

And I hereby appoint LAURENCE B. DODDS, 58-25 Little Neck Parkway, Little Neck, New York, ~~XXX Broadway, New York, N.Y.~~, Registration No. 12,982, my attorney with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, oath, power of attorney, and this petition, this

26 day of [illegible], 19[illegible].

Inventor George F. Stradar
First name Middle initial Last name

Post Office Address
45 Berkley Road
Mineola, New York

State of New York
County of [illegible]
ss

Before me personally appeared GEORGE F. STRADAR *to me known to be the person described in the above application for patent, who signed the foregoing instrument in my presence, and made oath before me to the allegations set forth therein as being under oath, on the day and year aforesaid.*

[illegible] Campilonga
Notary Public

SEAL

HENRIETTA M. CAMPILONGA
NOTARY PUBLIC, STATE OF NEW YORK
No. 41-[illegible]55[illegible]50
Qualified in Qu[illegible] County
Cert. filed with Quee[illegible] Register
Commission expi[illegible] 30, 1951

This form may be executed only when attached to a complete application as the last page thereof.

Approved Single Signature Form
Sole Inventor
(No. 784)

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[redacted]

41/22

DIV. 67 1 203310 2

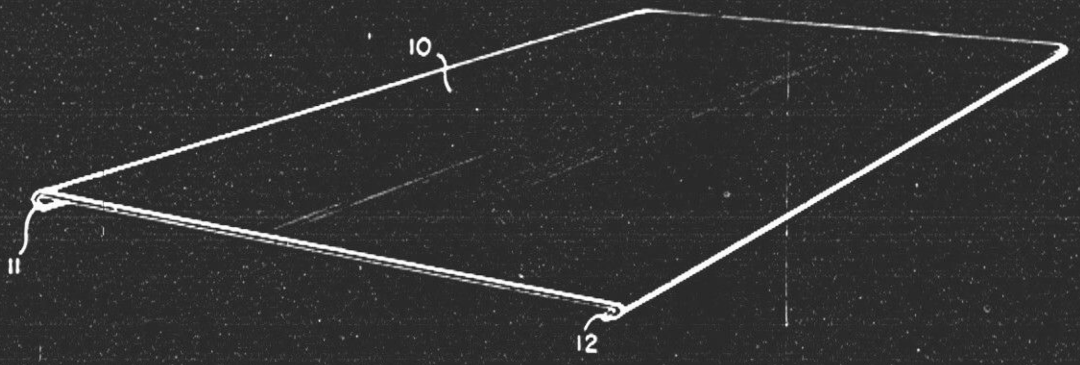

FIG. 1

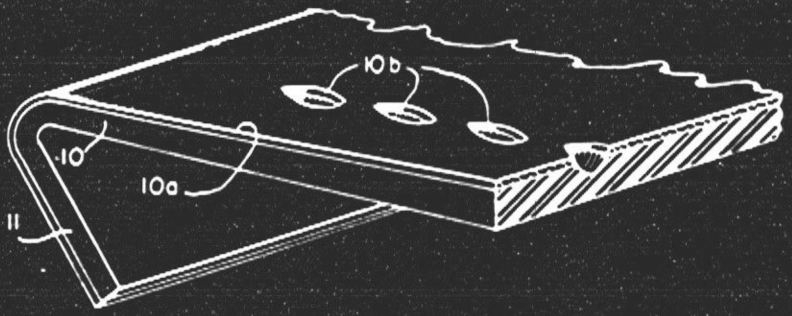

FIG. 2

INVENTOR.
GEORGE F. STRADAR

BY Laurence B. Dodds
ATTORNEY

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PAPER No. 3

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON 25, D. C.

DEPARTMENT O[illegible]OMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

MAILED
SEP 11 1951
PATENT EXAMINING DIVISION 67

Please find below a communication from the EXAMINER in charge of this application.

John A. Marzall
Commissioner of Patents

Laurence B. Dodds
58-25 Little Neck Parkway
Little Neck, N. Y.

GPO 16—27315-8

Division: 67 - Room 2845
Applicant: George F. Stradar
Ser. No. 203,310
Filed Dec. 29, 1950
For IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME

This application has been examined.

Reference made of record:

Ford	2,314,975	Mar. 30, 1943	41-41 uxr

The claims are rejected as substantially fully met by Ford. The exact structure and method steps recited are present in Ford. It is patentably immaterial that applicant contemplates using the article for a different purpose.

C. F. Krafft
Examiner

DHS:wmc

MAIL DIVISION
JAN 31 1952
U.S.P.O.

DIVISION 67
FEB -4 1952

4/a

IN THE UNITED STATES PATENT OFFICE

Docket 221
(F-256)
LBD:PC

In re application of)
GEORGE F. STRADAR)
Serial No. 203,310) Division 67 - Room 2845
Filed December 29, 1950)
For: IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME.)

HONORABLE COMMISSIONER OF PATENTS,
Washington 25, D. C.

S i r:

In response to the Office Action dated September 14, 1951, please amend the above-entitled application, as follows:

Claims 1-13, inclusive, line 2 of each,) before "sheet"
Claim 15, line 4,) insert

-- finished-surface --

Claims 1-13, inclusive, line 3 of each, before "having"
insert -- , only one face thereof --

Claims 1-13, inclusive, and claim 15, last line of each,
before the period (.) insert

-- , said treated surface material retaining substantially the original character of the finished surface --

a

BEST CO

Claim 14, line 1, cancel "an" and substitute

-- a finished-surface --

line 3, after "of" insert

-- only one face of --

line 7, after "engraving" and before the period

(.) insert

-- while retaining substantially the original character of the finished surface --

Claim 15, line 5, after "material" insert

-- , only the engraving side thereof --

REMARKS

Each of claims 1-15, inclusive, has been amended more accurately to define applicant's invention and more clearly to distinguish from the art of record.

Reconsideration of the rejection of claims 1-15, inclusive, as amended, as substantially fully met by the disclosure of Ford patent 2,314,975 is respectfully requested. That patent describes a process for producing a non-transparent milky-white or frost-like coating on a transparent plastic plate for decorative purposes (page 1, column 1, lines 9-15). The plate is of polymerized crylic resin (Plexiglass) or methyl methacrylate (Lucite) and is treated by dipping for 8 to 15 seconds in a bath of boiling solvent for the plastic, for example, a 70% solution of isopropyl alcohol (Page 1, column 2, lines 49-55). The plate is then removed from the boiling solvent bath and

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DEPARTMENT OMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

MAILED
SEP 8 - 1952

Paper No. 5

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

Please find below a communication from the EXAMINER in charge of this application.

PATENT EXAMINING
DIVISION 67

John A. Marzall
Commissioner of Patents.

Laurence B. Dodds
58-25 Little Neck Parkway
Little Neck, N. Y.

GPO 16—27315-9

Applicant: George F. Stradar
Ser. No. 203,310
Filed December 29, 1950
For Image-Engraving Plate and Process of Producing the Same

Responsive to the amendment filed January 31, 1952.

Claims 1 to 13 are rejected as unpatentable over Ford. The exact structure recited is present in Ford. The specific thickness surface treatment recited in some of these claims amounts to merely a question of choice and degree and not kind. The specific solvent recited in some of these claims has been given no weight, since the solvent does not appear in the finished plate. An examination of the article would not reveal that it had been treated with the specified solvent. Furthermore, the use of a specific solvent comprises method limitations improper in article claims. The article of Ford may be considered an engraving plate in the broadest sense. It is therefore analogous art.

Claim 14 is rejected as unpatentable over Ford. It would [illegible] merely [illegible] choice to treat merely one side [illegible] material [illegible]. As far as the article per se is concerned, there is [illegible] way [illegible] how deep the engraving tool will cut. Both Ford and applicant are treating the surface of plastics and therefore are working in analogous arts.

Claim 15 is rejected as involving no invention over Ford. Ford clearly shows the engraving of the treated surface to remove a part thereof to form a design. As far as the method is concerned, it is patentably immaterial whether it is done with a heated stylus or a sandblast. The use of specific

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apparatus is improper in method claims and accordingly can be given no weight. The one is an obvious substitution for the other.

This action is made FINAL under Rule 113.

DHS:lbh

C. F. Krafft
Examiner.

[redacted]

DIVISION

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IN THE UNITED STATES PATENT OFFICE

Docket 221
(F-256)

In re application of
GEORGE F. STRADAR
Serial No. 203,310
Filed December 29, 1950
For: IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME.

Division 67 - Room 2845

AFFIDAVIT UNDER RULE 132

State of New York)
) ss:
County of Nassau)

CROCKETT A. HARRISON, being duly sworn, deposes and says:

That he resides at Amityville, Nassau County, New York, and is Vice-President of Fairchild Camera and Instrument Corporation (hereinafter called "Fairchild"), assignee of the above-entitled application;

That since 1945 he has been thoroughly familiar with and responsible for the commercial business of Fairchild in the field of photoelectric engravers of the type described and claimed in United States Patent No. 2,575,546 to Boyajean and engraving plates of the type described in the above-entitled application, and is familiar with the specifications and characteristics of such plates requisite to commercial acceptance;

That initially Fairchild supplied to commercial users of its photoelectric engraving machines clear uncolored engraving plates of cellulose nitrate but that there arose difficulties in the use of such engraving plates in that it was difficult to determine from inspection of the engraved plate the quality or character of the picture formed thereon and that this gave rise to certain customer dissatisfaction;

That a number of preliminary attempts were made to solve this problem by applying a colored film or coating which was cut through during the engraving process but this proved unsatisfactory and the problem was referred to George F. Stradar, applicant of the above-entitled application; that said Stradar conducted extensive series of experiments with various treatments of the surface of the engraving plate, but was confronted by the fact that the treatments of the surfaces of the engraving plates were either such as to impair the quality of the surface necessary for satisfactory engraving or were so fugitive that they were partially removed by the spacing shoe of the engraving head of the machine during engraving but that finally, after a period of months, said Stradar devised a treatment resulting in the engraving plate described and claimed in the above-entitled application;

That since their introduction in 1949 colored surface engraving plates made in accordance with the disclosure of the above-entitled application have completely supplanted clear uncolored engraving plates and that sales in such colored surface plates have rapidly and continuously

[redacted]

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grown, as shown by the following table:

Year		Approximate Annual Sales
1949	-	$106,000
1950	-	295,000
1951	-	485,000
1952	-	717,000

That the reasons why such colored surface plates were important to commercial users of the Fairchild photoelectric engravers include the following:

1. Setting of Black and White Adjustment of Engraver facilitated. As described in more detail in the aforesaid Boyajean patent 2,575,546, column 13, lines 28-74, when initially setting up the engraver the scanning light is focused first on a dark area and the deformations being made in the engraving plate are observed through a stroboscopic microscope. The setting of the black level adjusting knob of the engraver is determined by the type of deformations being formed and the operator is instructed as to what constitutes satisfactory deformations for black or shadow in the reproduced picture. A similar process is followed in setting the white level adjusting knob of the engraver by focusing the scanning light on a white or highlight area and adjusting the knob until deformations are obtained corresponding to instructions. When working with clear uncolored plastic plates, such as cellulose nitrate, it is impossible by looking through the stroboscopic microscope to determine with adequate accuracy the type of deformations that are being formed. However, by the use of an engraving plate with one colored surface

there is established a reference plane in that surface so that the size and depth of the deformations being formed in that plane can be accurately observed through the microscope. These settings of the black and white level adjustments of the engraver are the only operations requiring skill or judgment and, hence, it is of the utmost importance to make these operations as simple as possible. It is affiant's considered judgment from personal experience and that of many users that the colored surface plastic engraving plate greatly facilitates the setting of the black and white level adjustments of the engraving machine and greatly simplifies the operation of the machine.

2. Inspection of Engraving Plate. In the case of clear uncolored engraving plates, it is difficult to determine the quality of the plate after engraving by inspection. Such quality can be determined only by special methods of illumination and examination through a magnifying glass or equivalent. Such an operation requires skill, is time consuming, and is cumbersome. In the case of colored surface engraving plates as described in the above-entitled application, the quality of the engraving can be readily determined upon inspection against a light background. This simplification and convenience have greatly added to the commercial attractiveness of colored surface engraving plates.

3. Reduction of Mistakes in Printing. In the case of clear uncolored engraving plates, frequently the character of the picture is such that it is difficult to determine which is the top and which is the bottom of the

engraving and experience of Fairchild's customers has been that pictures have frequently been published upside down because of this difficulty when using such engraving plates. This difficulty is eliminated by the use of such colored surface engraving plates and the printing mistakes previously encountered have virtually disappeared.

4. Psychological Advantages. The experience of Fairchild's field service representatives has been that there was considerable scepticism shown by users of the Fairchild engraving machine when using uncolored engraving plates because the average operator could not see clearly the image formed on the plate and, therefore, had no confidence in it. This lack of confidence has been eliminated by the use of colored surface engraving plates which have an appearance more nearly like ordinary photochemically engraved plates. After an initial commercial use of the colored surface engraving plates of the type described in the above-entitled application, some difficulty was experienced in maintaining uniformity of the plates and a survey was made to determine whether Fairchild's customers would accept clear uncolored engraving plates in lieu of the colored surface plates. This survey established the fact that a substantial number of Fairchild's customers refused to return to the use of uncolored engraving plates and advised that they would discontinue the use of the Fairchild engraving machine if colored surface engraving plates could not be supplied.

Sworn to and subscribed before
me this 16 day of February, 1953.

Henrietta M. Campilongo

[illegible] CAMPILONGO
NOTARY PUBLIC, [illegible] New York
No. [illegible]
Qualified in Nassau County
Cert. filed with Queens Co. Clk. & Reg.
Term Expires March 30, 1953

5-34

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

Paper No. 7

Applicant	George F. Stradar
Ser. No.	203,310
Filed	Dec. 29, 1950
For	IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME

Laurence B. Dodds
58-25 Little Neck Parkway
Little Neck, N. Y.

Please find below a communication from the EXAMINER in charge of this application.

Commissioner of Patents.

Responsive to argument filed Feb. 24, 1953.

Additional references made of record:

Hickman	1,900,877	Mar. 7, 1933	95-5 A
Hickman	1,957,888	May 8, 1934	95-5 A

The rejection of the claims has been reconsidered in light of the affidavits and additional showing but it is still thought that the final rejection was sound and proper.

The additional showing and affidavits will be entered for purposes of appeal subject to a rejection of the claims on the Hickman patents, above cited and made of record by applicant.

The statutory period runs from September 8, 1952, the date of the final rejection.

C. J. Krafft
Examiner

DHS:wmc

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IN THE UNITED STATES PATENT OFFICE

Docket 221
(P-256)
LBD:PC

In re application of
GEORGE F. STRADAR
Serial No. 203,310
Filed December 29, 1950
For: IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME.

Division 67 - Room 2845

APPEAL TO THE BOARD OF APPEALS

COMMISSIONER OF PATENTS,
Washington 25, D. C.

Sir:

Applicant hereby appeals to the Board of Appeals from the decision of the Principal Examiner dated September 8, 1952, finally rejecting claims 1-15, inclusive.

A check in the amount of $25.00 to cover the appeal fee is enclosed herewith.

Respectfully,

Attorney for Applicant.

Little Neck, N. Y.,
Dated: March 5, 1953.

(Enc)

[redacted]

BOARD OF APPEALS
MAY 6 1953
U. S. PATENT OFFICE

#7
Brief Applic

IN THE UNITED STATES PATENT OFFICE

Docket 221
(F-256)

In re application of)
GEORGE F. STRADAR)
Serial No. 203,310) Division 67 - Room 2845
Filed December 29, 1950)
For: IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME.)

SUPPLEMENTAL AFFIDAVIT UNDER RULE 132

State of New York)
) ss:
County of Queens)

CROCKETT A. HARRISON, being duly sworn, deposes and says:

That he is the CROCKETT A. HARRISON who on or about February 16, 1953, executed an Affidavit under Rule 132 in the above-entitled application;

That in the paragraph beginning at the bottom of page 2 of said Affidavit it is stated that colored surface engraving plates made in accordance with the disclosure of the above-entitled application went into commercial use in 1949 and at the top of page 3 is included a table showing sales of such plates by Fairchild Camera and Instrument Corporation, assignee of the above-entitled application, during the years 1949-1952, inclusive, and that such figures were supplied to him by the Accounting Department of the Fairchild Company from the company's regular books of account;

That since the execution of aforesaid Affidavit of February 16, 1953, he has rechecked with the Accounting Department of the Fairchild Company the sales of such colored surface engraving plates and finds that the figures stated in said Affidavit are in error and that such error arose through a misunderstanding between affiant and the Accounting Department of the Fairchild Company as to the items to be included in said figures;

That actually such colored surface engraving plates made in accordance with the disclosure of the above-entitled application were first sold and put into commercial use in the year 1950 and the correct sales figures for such plates by years during the intervening period are as follows:

Year		Approximate Annual Sales
1950	-	$414,300
1951	-	$703,411
1952	-	$1,059,483

Sworn to and subscribed before

me this [illegible] day of [illegible], 1953.

Notary Public

POL-61

ADDRESS ONLY
THE COMMISSIONER OF PATENTS
WASHINGTON 25, D. C.

DEPARTMENT OF COMMERCE
UNITED STATES PATENT OFFICE
WASHINGTON

PAPER No. 10

All communications respecting this application should give the serial number, date of filing, name of the applicant, and appeal number.

In re application of
George F. Stradar

Ser. No. 203,310
Filed Dec. 29, 1950
For IMAGE-ENGRAVING PLATE AND PROCESS OF PRODUCING THE SAME

Appeal No. 36936

Before the Board of Appeals

MAILED
JUL 1 - 1953

Laurence B. Dodds for Appellant

Examiner's Statement

This is an appeal from the final rejection of claims 1 to 15, all the claims remaining in this application.

A correct copy of the appealed claims appears on pages 8 to 10 of applicant's brief, Paper No. 9.

The references relied upon are:

Hickman	1,900,877 Mar. 7, 1933
Hickman	1,957,888 May 8, 1934

The invention has been adequately described in applicant's brief.

The references are adequately described in applicant's brief.

The rejection of the claims on Ford is withdrawn.

Subsequent to the final rejection applicant presented additional arguments, exhibits and an affidavit. These additional

84

showings were admitted subject to applicant permitting a rejection of the claims on the Hickman patents. All the actual structure recited in claims 1 to 13 and the process steps of claims 14 and 15 are thought to be present in each of the Hickman patents. As far as the recited plate per se and method of making it are concerened, it is thought be be patentably immaterial that applicant intends to put it to a specific use. In other words, there is nothing in the structure of the plate recited to make it peculiarly adapted to the engraving arts rather than the photographic uses of the references. Therefore, applicant's arguments that the references are from a non-analogous art are not persuasive. The commerical success alleged has been considered but fails to convince the examiner that the claims avoid the references. Accordingly, it is thought that the final rejection was sound and proper.

Respectfully submitted,

C. J. Krafft
Examiner, Division 67

DHS: has

Laurence B. Dodds
58-25 Little Neck Parkway
Little Neck, N.Y.

Paper No. 12

MAILED
APR 30 1954
U. S. PATENT OFFICE
BOARD OF APPEALS

Appeal No. 369-36 fds

Hearing:
March 17, 1954

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte George F. Stradar

- - -

Application for Patent filed December 29, 1950, Serial No. 203,310. Image-Engraving Plate and Process of Producing the Same.

Laurence B. Dodds for appellant.

This is an appeal from the final rejection of claims 1 through 15, all the claims in the case.

Claims 6, 14 and 15 are illustrative:

> 6. An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of cellulose nitrate, only one face thereof having a surface portion treated with a mixture of approximately 95% methyl alcohol and an aniline dye in a concentration of the order of 0.2%, said treated surface material retaining substantially the original character of the finished surface.
>
> 14. The process of producing a finished-surface engraving plate for reproducing images by printing processes which comprises treating a surface portion of only one face of a deformable plastic material with a solution of a dye in a mutual solvent for the dye and the plastic material so as to impregnate the material with the dye to a depth less than the maximum deformation encountered in engraving while retaining substantially the original character of the finished

surface.

15. The process of producing an engraved plate for reproducing images by printing processes which comprises applying a heated engraving stylus, in a predetermined pattern, to a finished-surface sheet of deformable thermoplastic material, only the engraving side thereof having a surface portion treated to a depth less than the maximum deformation encountered in engraving with a mixture of a dye and a co-solvent for the thermoplastic material and the dye, said treated surface material retaining substantially the original character of the finished surface.

The references relied upon are:

Hickman,	1,900,877,	Mar. 7, 1933,
Hickman,	1,957,888,	May 8, 1934.

The claims relate to: (1) a blank plastic sheet to be photoelectrically engraved and used for reproducing images by a printing process (claims 1 through 13); (2) a process of producing the blank sheet (claim 14); and (3) a process of producing an engraved plate from the blank sheet (claim 15). The invention which is the subject matter of the claims was made by the appellant to avoid the shortcomings of clear uncolored plastic sheets which were initially used in a photoelectric engraving machine of the type disclosed in Patent No. 2,575,546 to Boyajean. As stated in the brief:

> "The engraving plates initially used on the Boyajean machine were clear, uncolored sheets of cellulose nitrate on which the half-tone engraving was formed by rapidly reciprocating the heated stylus of the machine which scanned the plate synchronously with the photoelectric pickup of the machine. This formed a series of minute indentations by thermal decomposition, the depth and area of each indentation depending upon the brightness of the elemental area of the image then being scanned, thereby forming the well-known screen or half-tone pattern. The details of the operation of such a machine are described in the Boyajean patent.

> "While the transparent uncolored engraving plates were entirely satisfactory from the standpoint of actually engraving and were used extensively, they had a number of disadvantages which led to customer dissatisfaction. This dissatisfaction arose primarily from the difficulty of determining the character of the engraving on the clear uncolored plate because of the lack of contrast between portions of the plate representing different shade or tonal values in the picture."

The appellant apparently overcame the above described disadvantages by treating only one surface of the sheet with a mixture of a dye and a mutual solvent for the dye and the nitrocellulose.

It is stated on page 6 of the specification that:

> "The amount of the mixture applied to the sheet is not critical but is adjusted subjectively by the operator to get a desired degree of color saturation. The amount of mixture should be controlled so that it penetrates the surface of the sheet to a depth substantially less than the maximum deformation of the sheet during the engraving process, for example, to a depth of the order of 0.0001 inch. The exact amount of treating mixture can be best determined by experiment in the light of the foregoing criteria."

Judging from the Examiner's Statement, the sole ground for the rejection of the claims is that they are unpatentable over the Hickman patents.

Hickman 1,900,877 discloses that it is old to incorporate a blue dye on either side of a motion picture film in order to avoid halation. According to the disclosure in this patent the dye is mixed with a solvent consisting of acetone and methyl alcohol and the mixture is applied on either side of the film employing any of the well known means for application of the dye. It is stated in this patent that:

> "The solvent will penetrate the support sufficiently to embody permanently the dye in the surface thereof, so that it will not be removed in the ordinary photographic processes, such as are employed in the continuous machines now customarily employed for motion picture purposes.
>
> "Film tinted with the mixture just described has a light steel blue color,".

The portion of the Hickman patent 1,957,888 which is pertinent to the claims under consideration reads as follows:

> "It has been common practice to dye film by applying solutions of dyes in organic liquids which carry the dyes into the body of the film, the liquid usually being a partial solvent for the film base as well as for the dye. These dyes are usually applied after the process of film forming by a series of rolls which transfer the dye to one side of the film. This dyeing may be accomplished, of course, by immersing the film or running it through a dye bath, but usually it is desired to dye but one side of the film."

In rejecting the claims on the above described references, the Examiner holds:

> "All the actual structure recited in claims 1 to 13 and the process steps of claims 14 and 15 are thought to be present in each of the Hickman patents. As far as the recited plate per se and method of making it are concerned, it is thought to be patentably immaterial that applicant intends to put it to a specific use. In other words, there is nothing in the structure of the plate recited to make it peculiarly adapted to the engraving arts rather than the photographic uses of the references. Therefore, applicant's arguments that the references are from a non-analogous art are not persuasive. The commercial success alleged has been considered but fails to convince the examiner that the claims avoid the references."

In controverting this rejection the appellant argues that Hickman 1,900,877 does not disclose, in detail, the nature of the tinted surface portion of the film nor the process for effecting the tinting. He suggests that "it seems probable that the method referred to is that of the later Hickman patent 1,957,888, which, however, was filed about a year and a half earlier." He points out that this later patent describes a process for tinting photographic film which comprises treating it with a hydrolizing bath, applying a mordant by immersing the film in a solution of tannic acid and treating the film in an aqueous dye solution. He contends that this treatment will produce a rough surface on the film which will render it unsuitable for his purpose. He further contends that "motion picture film is a flimsy article which, of course, is not capable of being engraved or serving as an engraving plate."

We are unimpressed by these arguments because the appellant is overlooking the process and the film disclosed in the Hickman patents which the Examiner is relying on to negative invention in the claims. As indicated in our description of the Hickman patents, they disclose quite clearly that a photographic film which is tinted on one side in precisely the manner that the appellant tints the plastic material which constitutes his engraving plate is old. The process disclosed in Hickman 1,957,888, which the appellant has described in his brief, is obviously an improvement over the other processes disclosed in the Hickman patents, which we have described, and is not relied on by the Examiner to negative invention in the claims under consideration.

[redacted]

As regards the argument that motion picture film is a flimsy article and is not capable of being engraved, we note that Hickman 1,957,888 discloses that photographic film generally has been tinted by the claimed process. We are not satisfied that photographic film is never made of heavy enough material to be engraved. Furthermore, the difference, if any, between tinted photographic film and the tinted plate recited in the claims is one of degree which is unaccompanied by any unobvious results. It is, therefore, without patentable significance.

The appellant further argues that the Hickman patents are in a nonanalogous art and are concerned with problems totally foreign to that solved by him. He contends that their disclosure is, therefore, as a matter of law, not anticipatory; citing in support of this contention Ex parte Moore et al, 87 USPQ 378.

Admitting that the Hickman patents are from a nonanalogous art, it does not follow that their teaching may not be anticipatory because it is well established that "a reference cited from alleged nonanalogous art is a proper reference, if the disclosure thereof suggests doing that which the appellant has relied upon to endow his claims with patentable distinction." In re Edwin C. Weiskopf, 581 OG 571; 100 USPQ 383. Ex parte Moore et al is, in our opinion, not controlling here because we held there:

> "In the present case, a new article is evolved by the new use, because, while we agree with the examiner that the alloy of which the claimed piano plate is made is suggested in the prior art and may, therefore, be considered to be old, there is a vast difference between a mere alloy and a piano plate which is

> a specific mechanical element of peculiar utility, different from plates of more general utility and structure, and easily differentiated therefrom by those conversant with the art." (Emphasis added)

In contradistinction, the engraved plate claimed in the present case is, in our opinion, not distinguishable from the photographic film disclosed in the references. The rejection of claims 1 through 14 as unpatentable over the Hickman patents will, therefore, be sustained.

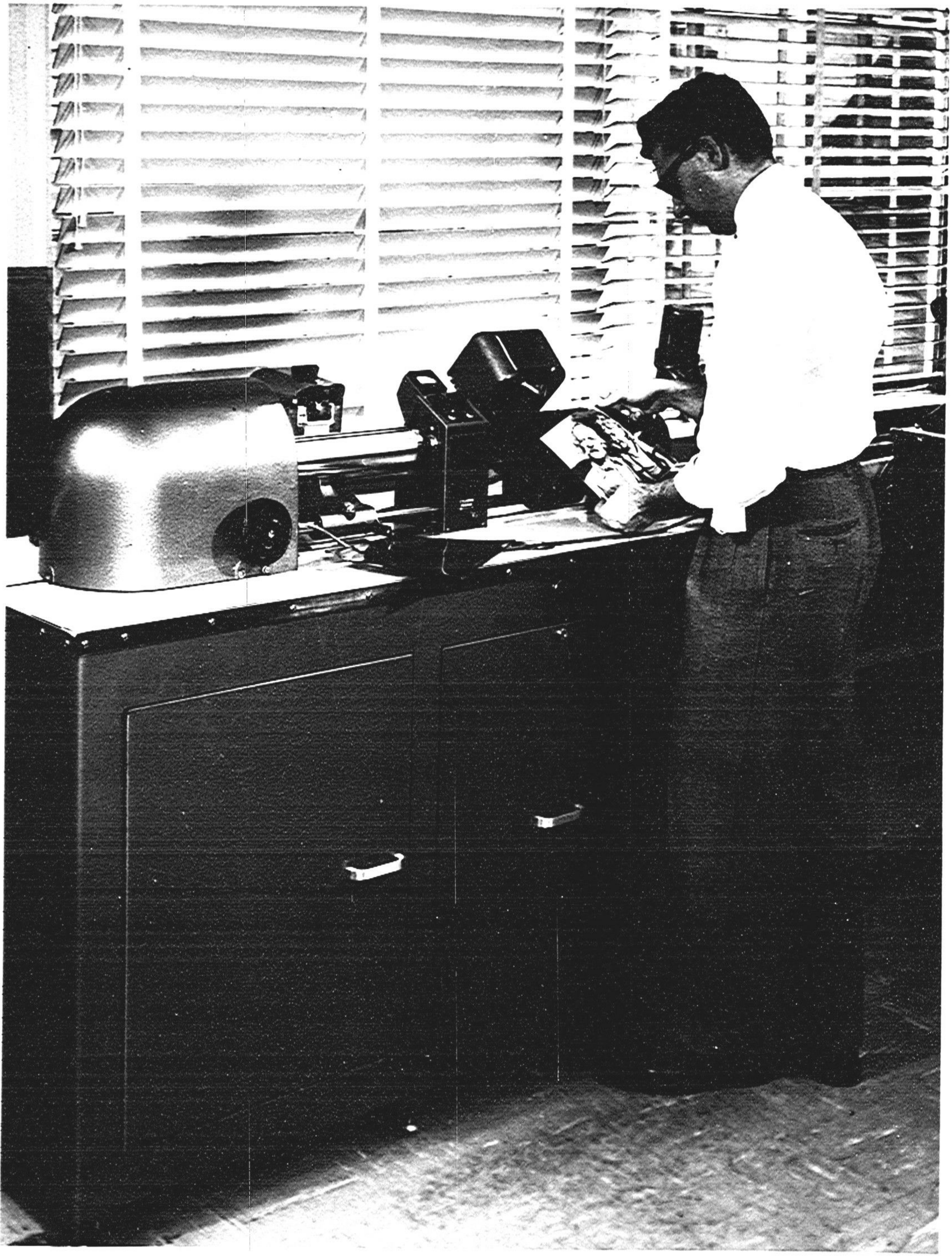
However, we are of the opinion that the rejection of claim 15 on these patents is not well founded. The process recited in this claim comprises applying a heated engraving stylus in a predetermined pattern to a tinted plate of the type described above. This process is neither disclosed nor suggested in the Hickman patents. We are of the opinion that in view of the significant and unobvious results that the appellant obtains by substituting the tinted plate recited in this claim for the clear plate which has been previously used in this process, and the outstanding commercial success of the claimed process, this substitution renders the claimed process patentable. In re Maxwell et al, 650 OG 5; 188 F.(2d) 479; 89 USPQ 387. Ex parte Wagner, 642 OG 1009.

The decision of the Examiner is affirmed with reference to claims 1 through 14 and reversed as to claim 15.

Examiner-in-Chief)
C. S. Duncombe
Examiner-in-Chief) BOARD OF APPEALS
M. W. Tucker
Examiner-in-Chief)
(Acting)

April 30, 1954

Laurence B. Dodds
58-25 Little Neck Parkway
Little Neck, New York



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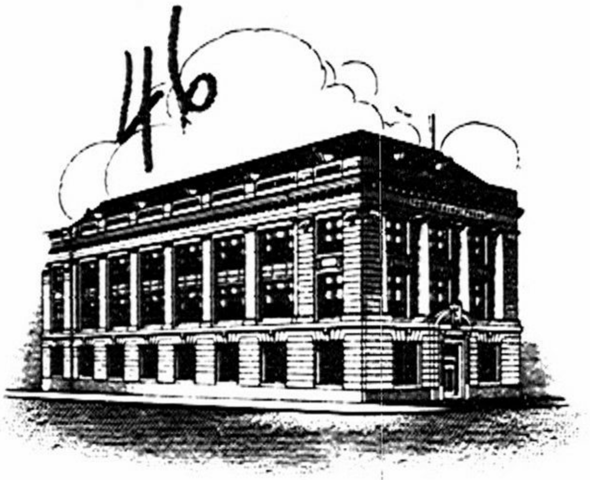
MAY 19 A.M.

STRADAR ET AL V. WATSON
CIVIL ACTION 2426-54
PLAINTIFFS' EXH. NO. 9



THE GRAND RAPIDS PRESS

GRAND RAPIDS 2, MICH.

May 17, 1949

Mr. R. C. McPherson
Graphic Arts Division
Fairchild Camera & Instrument Corp.
88-06 Van Wyck Blvd.
Jamaica 1, N.Y.

Dear Mr. McPherson:

I have a problem in connection with our Fairchild engraver that Mr. Kaeding has suggested I take up with you.

We have found that when we prove a cut before it is used in the paper, we are unable to clean it up sufficiently to prevent smudging. It has been suggested to me that the cut retains the ink because the shape of the indentations changes when the plastic which received the indentations as a cylinder changes to a flat shape. Mr. Kaeding thought that perhaps our solvent was damaging the plastic, but we use naphtha, and I understand that most papers using the Fairchild engraver also use naphtha as the ink solvent.

Having run into this problem, we now are forced to use our cuts without proving before use, but we are reluctant ever to use any cut without a proof.

I should appreciate any suggestions you have for solving this situation.

Yours truly,

M. M. Kesterson

M. M. Kesterson,
Managing Editor

MMK/M

FEB 2 A.M.

THE STAR-BEACON
A COUNTY-WIDE COMMUNITY NEWSPAPER
PUBLISHED BY
THE ASHTABULA PRINTING COMPANY
ASHTABULA, OHIO
MEMBER OF THE OHIO SELECT LIST OF NEWSPAPERS

STRADAR ET AL V. WATSON
CIVIL ACTION 2426-54
PLAINTIFFS' EXH. NO. 10

January 30, 1950

D.B. Hollister, Sales Manager
Graphic Arts Division
Fairchild Camera and Instrument Corporation
88-06 Van Wyck Boulevard
Jamaica 1, N.Y.

Dear Mr. Hollister:

Your letter of January 27th to my brother, R.B. Rowley, has been placed in my hands.

I have checked with our engraving department and find that they are now processing the plates with the new colored plate material.

We appreciate the research and progress that your firm is making.

My brother and I enjoyed talking with you at the Great Lakes Mechanical Conference. We hope that we can see you again at the ANPA Conference.

Sincerely,

Don Rowley

D.C. Rowley,
Co-Publisher.

DCR/ga

STRADAR ET AL V. WATSON
CIVIL ACTION 2426-54
PLAINTIFFS' EXH. NO. 11

EQUIPMENT REVIEW

More Than 200 Newspapers Reported Using Fairchild Electric Engraver

ONE YEAR after the first production unit was installed at the *Salem* (N. J.) *Sunbeam*, the Fairchild Photo-Electric Engraver is being used in more than 200 daily and weekly newspapers in 40 states.

This was revealed this week by C. A. Harrison, vicepresident in charge of sales for the Fairchild Camera & Instrument Corp., Jamaica, N. Y.

The idea for direct engraving was first conceived by Walter Howey, Hearst editor, but Fairchild undertook the development of the machine after the assignment of patent rights in 1937.

Extensive experimentation was undertaken after the war and Fairchild put 23 trial units in various newspapers before installing the first production unit in Salem on Feb. 2, 1949.

Circulation of the newspapers now using Fairchild Engravers range from 2,100 weekly to 104,000 daily.

Mr. Harrison noted that Acme Newspictures has developed a multi-print telephoto service, custom-built for users of the Fairchild. According to the Acme announcement at the recent Great Lakes Mechanical Conference, this is how it operates.

Picture editors in an Acme bureau select the day's best five news photos which have been transmitted on the nationwide Acme network. These are cropped to the most interesting picture area, and are reduced to standard one-column, two-column or three-column sizes.

The pictures are then assembled on a single 9" x 12" transmission print, with caption material included. The bureau transmits this multi-print on an Acme Telephoto Trans-ceiver, direct to the newspaper office.

The transmission takes 12 minutes, and the developing three minutes more and the whole picture group is ready for publication in less than an hour, including time for making plastic engravings on the Fairchild. The group of pictures can be engraved at the same time on one plastic. The five separate pictures can then be cut apart.

Many of the papers using semi-cylindrical presses have switched to direct printing of plastic cuts. The idea was first used experimentally by the *Ridgewood* (N. J.) *Herald-News* early in 1948 and later by the *Williamsport* (Pa.) *Gazette Bulletin and Sun*, the latter perfecting the method of direct printing now widely used.

Fairchild is now servicing its customers with a new plastic—dyed blue. Previously it was clear. With the new colored plastic, it is now possible to see what the actual engraving looks like without proofing.

It is expected to be especially helpful in that it permits the operator to check more easily the tone level settings of the machine, and thereby produce a better cut. In the mechanical department the cuts are more readily identifiable for proper mounting. It also aids in better matting since the stereotyper can actually see the detail in the cut and know that he must retain the same detail in the mat and stereo.

Mr. Harrison said some plants are making plastic cuts for as low as three cents per square inch.

Another development, he said, was the increased use of plastic cuts in advertising copy. Even line drawings are being engraved on plastic by some papers. Others are making effective reproductions of reverse line cuts or illustrations from magazines for advertising copy.

The *Tujunga* (Calif.) *Record-Ledger* sent in a copy of the paper in which cartoon-style drawings of local residents were reproduced effectively on the Fairchild.

The *Wilmington* (Del.) *Sunday Star* installed a Fairchild and added three photo news men, Frank Adler, Anthony Thien, and Al Kuhn, to the staff to increase picture coverage.

'Voice of Experience' On Electric Engraver

By A. L. Banks

This article was written by a senior in the University of Texas School of Journalism who has worked for two years on the desk for the *Austin* (Tex.) *American-Statesman* and seen the Fairchild engraving machine at work.

"Experience is the best teacher," says Charles E. Green, editor of the Austin (Tex.) American-Statesman, and we've certainly found that to be true in respect to pioneering the Fairchild engraving machine."

Mr. Green goes on to say that prior to leasing the machine his engraving costs were $1,200 to $1,500 a month for both papers and after getting the machine the engraving bill dropped to $30 to $40 a month and the total expense of engraving for both papers, with a combined circulation of more than 50,000 was cut in half.

The Fairchild firm leases the machine for $185 a month, the dayside and nightside copy boys have been trained to operate the machine, and last and most important, the morning paper can get local pictures in the paper without prohibitive overtime night rates to engravers.

Some of the operational problems that faced the American and Statesman when they first got the machine were: first, on attempting to roll mats from the plastic cuts. The needle cuts dots shaped like mushrooms in the plastic and despite the fact that the papers use a so-called "dry mat," they were damp enough for particles to get stuck underneath the dots and cause dark and fuzzy reproductions. This was solved by sticking the plastic cut directly on the printing plate.

Another problem was makeovers. Once the plastic cut is stuck on the plate it's very difficult to remove it, so the operator of the machine must make two plastic cuts of pictures that go on makeover pages, and with speed a major advantage of the machine, even unexpected makeovers, if not too numerous, can be handled without too much trouble.

Then some of the pictures began coming out upside down in the paper and it was found that after the stereos stuck the double-sided tape on the plastic it was hard for them to tell the top from the bottom. This was solved by having the desk mark on the back of the plastic with a grease pencil an arrow pointing to the top of the picture, the page number and guideline, then having the copyboy back the plastic with tape and send it down to the stereos.

The plastic cuts must be trimmed to a one-sixteenth-inch tolerance on the width in order to take care of the shrinkage of the mat and the slight spreading of the plastic under the pressure of printing.

Cuts Inflammable

The photographer also must be reminded that the Fairchild cannot enlarge a photo and the only way the plastic cut can be reduced is by simply cutting off part of it.

Another thing to be remembered about the Fairchild is that the plastic is very highly inflammable and the morgue, other than news-service mats, will have to consist of photographs from which plastic cuts can be made as needed.

Another disconcerting problem came up when the stereos developed a prejudice against the machine. This prejudice is having to be overcome gradually and with tact.

The plastic costs 70c for a 8½ x 11 sheet. The styli which cut the plastic must be sharpened every week by the company and they wear out about every six weeks. The machine must be serviced at least every two weeks by the company maintenance man.

LOUDSPEAKER ON REWRITE

Bob Talley of the Memphis Commercial Appeal got tired of taking down in longhand lengthy reports from correspondents while covering the recent Mississippi River floods. So to ease his arm and ear he had a small loudspeaker attached to his telephone, thus affording free use of both hands for the typewriter. Inset shows amplifier taped to the telephone box on the wall, connection being made by induction.

Dirty Space Bands Lifted with Gadget

When Jim Kaysen of the *Plainfield* (N. J.) *Courier-News* became assistant to his father-in-law, Johnny Cartwright, chief composing room mechanic, one of his duties was to clean space bands. Removing the bands was an annoying chore, so Jim decided to do something about it. Jim and Johnny put their heads together and came up with an idea.

They took a worn escapement lever from a Model 8 Linotype, bent and notched the end. With that as a tool, Jim could remove and replace all or any number of bands in a jiffy.

The in-laws have another time-saver, too. They have marked the framework of the space band slot so that they can tell at a glance each morning just how many bands are ready for use. If the bands fill the space up to the mark, they know the machine has the required 25 or 30 bands. When the required number are not on hand, the space differential indicates the number to be replaced.

Dec. 21, 1954 J. A. BOYAJEAN, JR Re. 23,914

MACHINE FOR PRODUCING SCREENED RELIEF PATTERN PLATES

Original Filed July 24, 1948 4 Sheets-Sheet 1

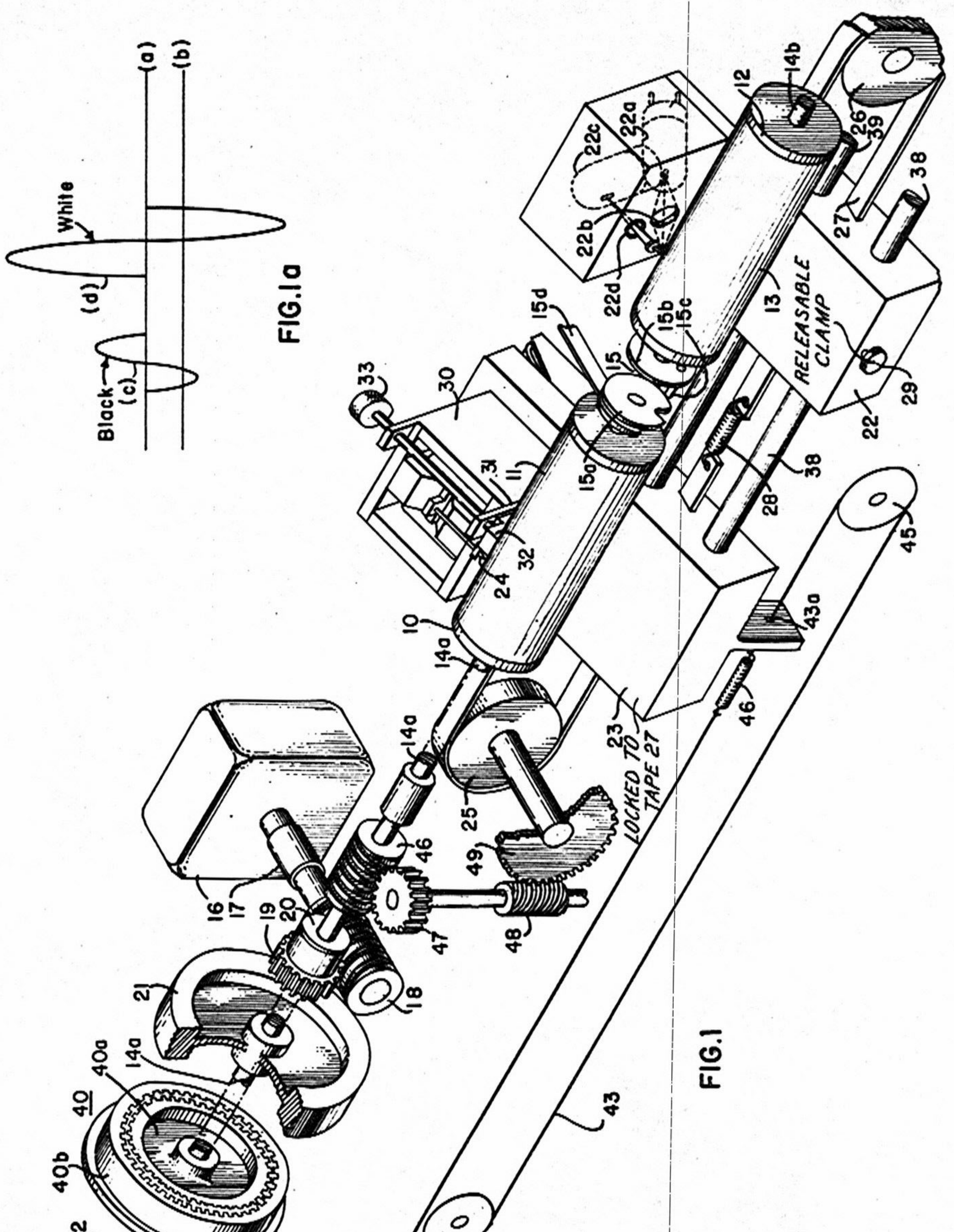


FIG.1a

FIG.1

INVENTOR.
JOHN A. BOYAJEAN, Jr.
BY Lawrence B. Dodds
ATTORNEY

Dec. 21, 1954 J. A. BOYAJEAN, JR **Re. 23,914**

MACHINE FOR PRODUCING SCREENED
RELIEF PATTERN PLATES

Original Filed July 24, 1948 4 Sheets-Sheet 2

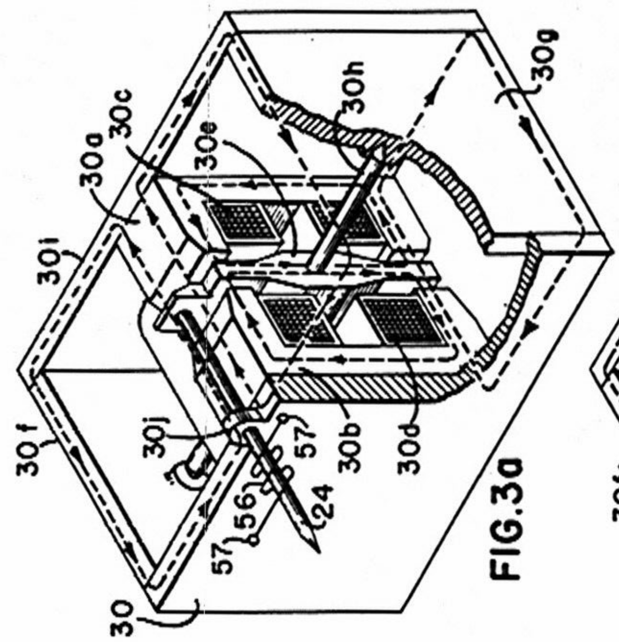


FIG.3a

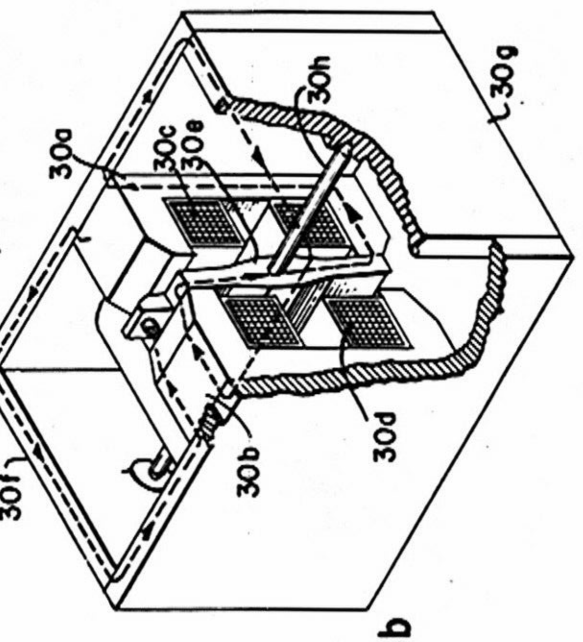


FIG.3b

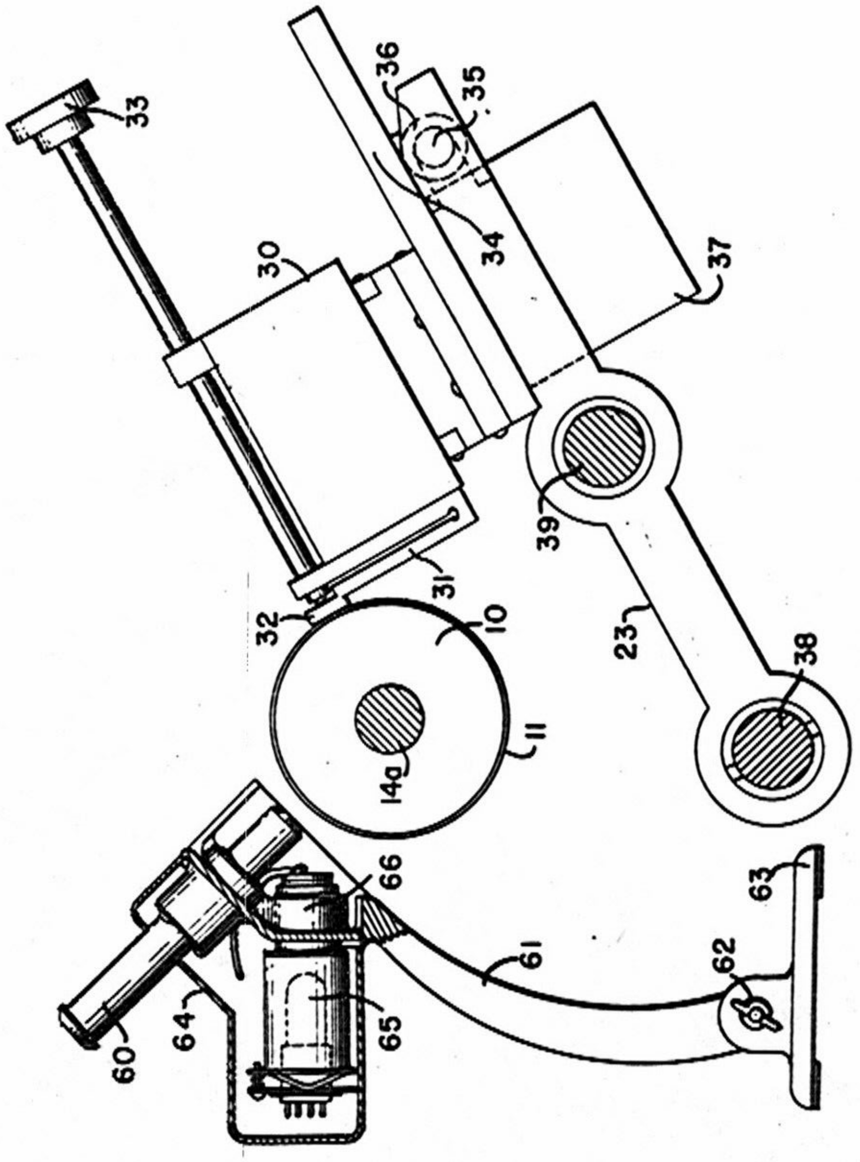


FIG. 2

INVENTOR.
JOHN A. BOYAJEAN, Jr.
BY Laurence B Dodds
ATTORNEY

Dec. 21, 1954

J. A. BOYAJEAN, JR
MACHINE FOR PRODUCING SCREENED
RELIEF PATTERN PLATES

Re. 23,914

Original Filed July 24, 1948

4 Sheets-Sheet 3

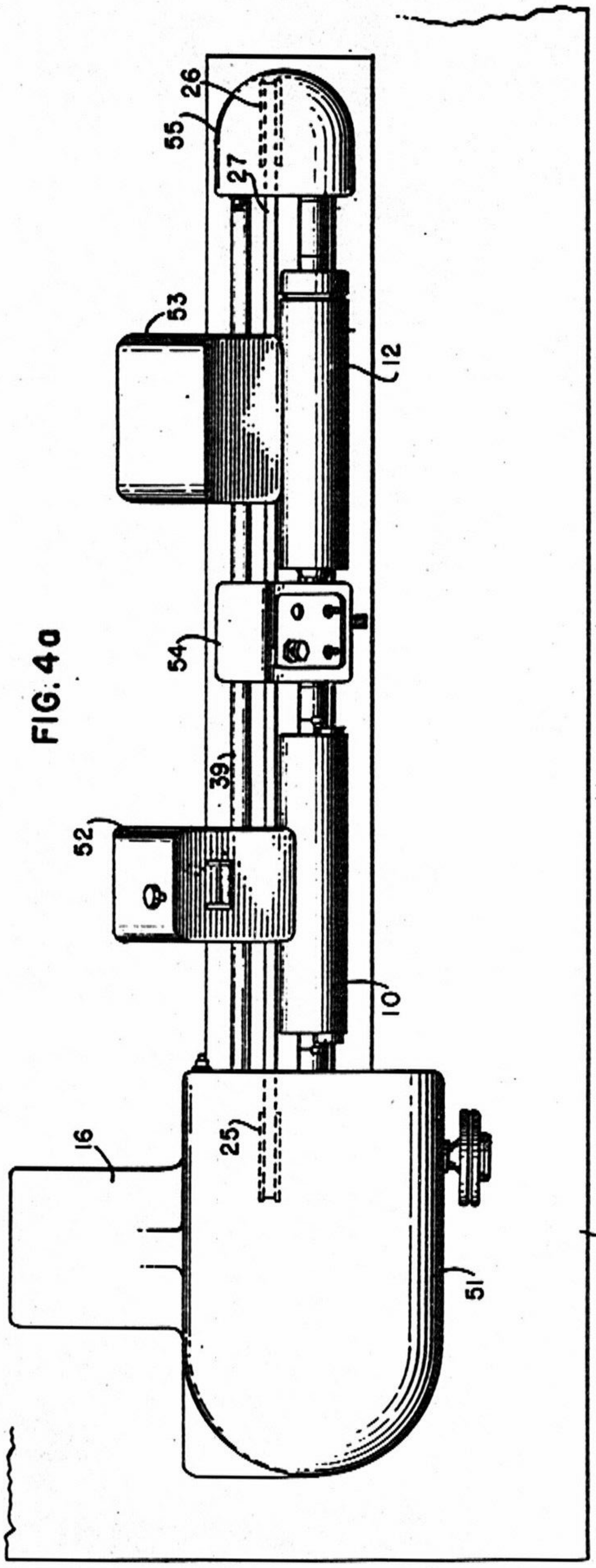


FIG. 4a

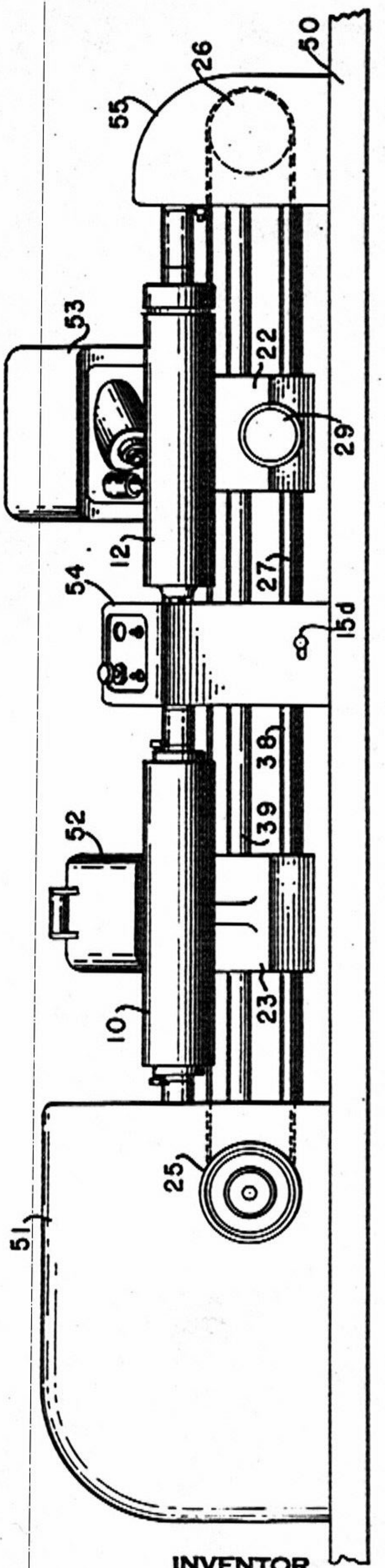


FIG. 4b

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BY Laurence B. Dodds
ATTORNEY

AVAILABLE

Dec. 21, 1954

J. A. BOYAJEAN, JR

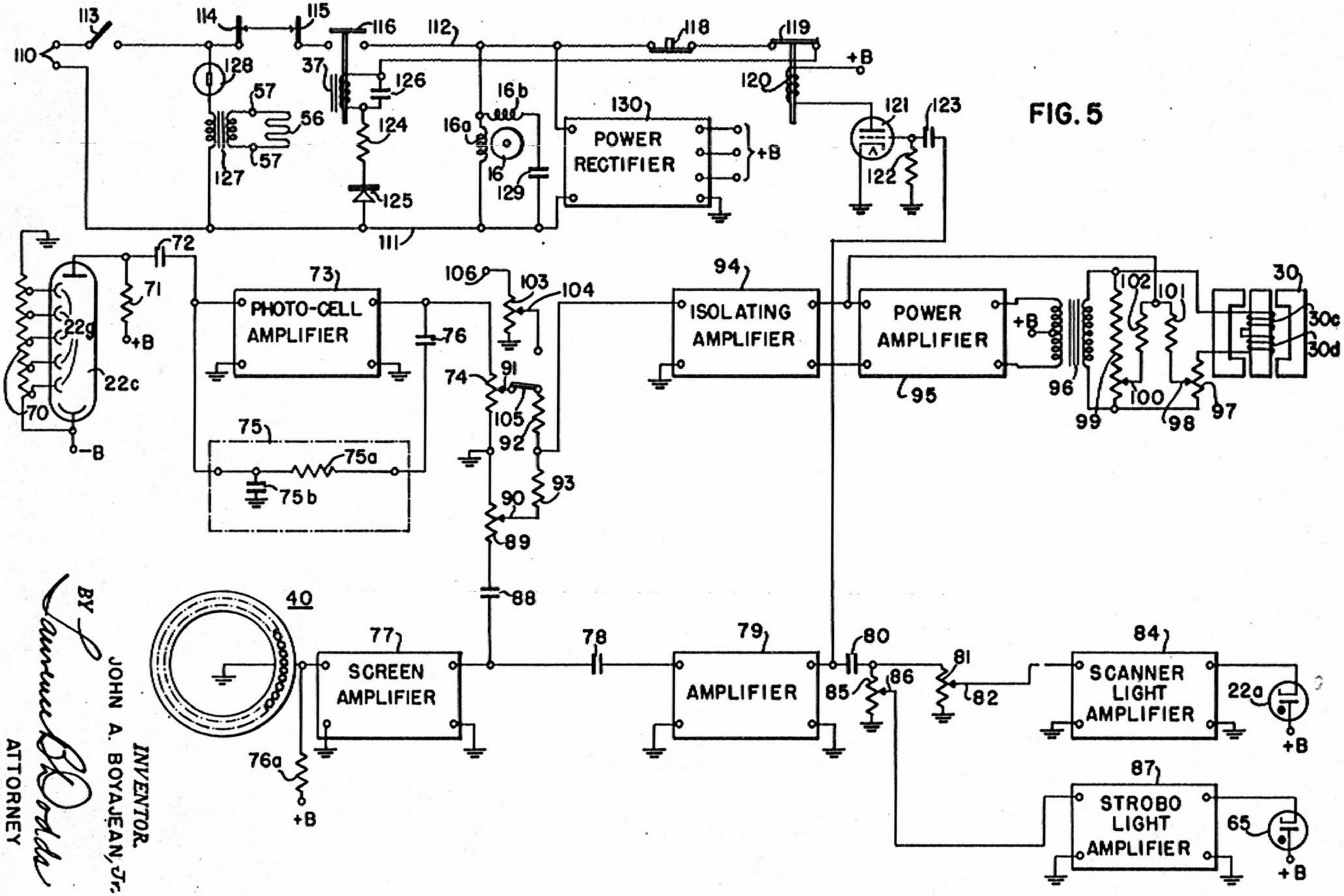
MACHINE FOR PRODUCING SCREENED RELIEF PATTERN PLATES

Re. 23,914

Original Filed July 24, 1948

4 Sheets-Sheet 4

FIG. 5



INVENTOR.
JOHN A. BOYAJEAN, Jr.

BY Laurence B. Dodds

ATTORNEY

United States Patent Office

Re. 23,914
Reissued Dec. 21, 1954

23,914

MACHINE FOR PRODUCING SCREENED RELIEF PATTERN PLATES

John A. Boyajean, Jr., Huntington, N. Y., assignor to Fairchild Camera and Instrument Corporation, a corporation of Delaware

Original No. 2,575,546, dated November 20, 1951, Serial No. 40,594, July 24, 1948. Application for reissue November 18, 1953, Serial No. 393,027

27 Claims. (Cl. 178—6.6)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to machines for producing screened relief pattern plates and, while it is of general application, it is particularly adapted for producing on a decomposable plate a half-tone reproduction of any reproducible image sheet, which plate is suitable for further reproduction of the image by printing or like duplicating processes.

In the reproduction of images, such as photographic prints or negatives by printing or like duplicating processes, it has been customary to produce half-tone engravings, that is, engraving plates having a "screen" structure composed of a series of regularly spaced dots, by photochemical processes. In such half-tone plates, the average size and spacing of the dots in each incremental portion of the plate vary proportionately with the average shade value or greyness of the corresponding portion of the image. The surfaces of these dots lie in the original plane of the plate and receive the printing ink from a roller or the like.

Such half-tone plates and their method of manufacture are well known in the art, so that no detailed description is required here. However, it is also well known that the process of making such photo-engravings involves elaborate and expensive equipment and a large number of steps, each of which must be performed with great care and skill in order to obtain a satisfactory half-tone plate. Such skill is generally acquired only by extended apprenticeship and artisans of the required skill are frequently unavailable. All of the foregoing factors contribute to the high cost of such half-tone plates and to the time required for their completion.

Heretofore there have been proposed various machines and apparatus for automatically and mechanically forming half-tone plates representative of an image to be reproduced. Such machines have generally included a support for an image sheet, a support for the plate to be formed, and mechanism for scanning the two supports synchronously. The image sheet scanner has included a photoelectric pick-up, the output of which is amplified electrically and utilized to actuate some type of plate-cutting or deforming tool carried by the plate scanner. An interrupter is included at some point in the system to produce the screen structure. In one previously proposed arrangement, the plate-deforming tool is in the form of a heated stylus acting on a plate of decomposable material but, in general, such proposed machines have utilized metal plates and the deforming tool has been a high speed rotating cutter or chipping or gouging tool. With this type of apparatus, the tool generally leaves small burrs or other irregularities over the face of the plate which seriously interferes with obtaining satisfactory reproductions. Furthermore, the metal plates used in such machines are generally heavy, costly, and difficult to ship and are easily damaged by improper handling.

Furthermore, the automatic machines for forming such half-tone plates heretofore proposed have been complex and cumbersome in operation and have been difficult to maintain in accurate adjustment, which is necessary to procure half-tone plates of reasonable cost and satisfactory quality.

It is an object of the present invention, therefore, to

provide a new and improved machine for producing screened relief pattern plates which obviates one or more of the above-mentioned disadvantages of the prior-art machines of the type described.

It is another object of the invention to provide a new and improved machine for producing screened relief pattern plates which achieves one or more of the following advantageous characteristics not hitherto realized: virtual elimination of skill or technique in operation of the machine; substantial reduction in time required to form a plate; ability to form a number of plates simultaneously; extreme accuracy of reproduction of all image shades; elimination of all chemical and photo-chemical processes; predetermination of the desired contrast range, that is, range from full white to full black; and a substantial reduction in the weight of the formed plates.

In accordance with one feature of the invention, there is provided a machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising a first cylinder for supporting a plate, a second cylinder for supporting an image sheet, and means for rotating the cylinders synchronously. The machine further comprises a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on the second cylinder, a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on the first cylinder, means responsive to the output of the pick-up system for actuating the plate-deforming tool, and means for reciprocating the carriages synchronously. The machine also includes an electrical screen generator including a rotor element driven synchronously with said cylinders and an independently rotatable stator, and means for rotating said stator at a speed of a lower order of magnitude than said rotor element, the output of said generator being connected to modulate the output of said pick-up system.

In the preferred embodiment of the invention, the engraving machine optionally includes other desirable features, among which are the following: the electro-optical pick-up system includes a light source and a source of pulsating current of screen frequency, such as the screen generator, connected for modulating such light source; in order to form on the plate an inverted image of that on the image sheet, the pick-up system carriage and the tool carriage are driven by a tensioned inelastic belt, one of the carriages being adapted to be locked to one run of the belt and the other being provided with a releasable clamp to engage the other run of the belt; further, the tool carriage comprises a tool-actuating assembly carrying the plate-deforming tool and means for biasing the tool assembly into engagement with the plate cylinder; the tool assembly also includes an adjustable shoe engaging a plate on the plate cylinder for determining the neutral position of the tool.

In accordance with another feature of a preferred form of the invention, a machine of the type described includes means for adjusting the output of the screen generator to adjust the minimum deformation of the plate, corresponding to the black level of an image sheet, and means for adjusting the output of the pick-up system substantially independently to adjust the maximum deformation of the plate, corresponding to the white level of an image sheet.

Another feature of the preferred form of the invention comprises means for biasing the plate-deforming tool to an inoperative position, a normally excited electromagnetic means for retaining the tool in an operative position, and means responsive to the failure of the source of periodic screen potential, such as the screen generator, for actuating the tool to an inoperative position.

For a better understanding of the present invention, together with other and further objects thereof, reference is had to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

Referring now to the drawings, Fig. 1 is a schematic perspective of a machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes; Fig. 1 is a chart to aid in explanation of the operation of the machine of Fig. 1;

Fig. 2 is a fragmentary view, partly in section, of the plate-deforming tool assembly of the machine of Fig. 1 together with an associated stroboscopic viewer; Figs. 3a and 3b are schematic perspective views of the tool-actuating mechanism in its neutral position and one extreme position, respectively; Figs. 4a and 4b are top plan and longitudinal elevational views, respectively, of the machine represented in Fig. 1; while Fig. 5 is a schematic electrical circuit diagram of the various electrical and electronic components of the machine of Fig. 1.

Referring now more particularly to Fig. 1 of the drawings, there is illustrated schematically a machine embodying the invention for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes. By the term "image sheet," as used herein and in the appended claims, is meant any sheet carrying an optical representation of the image to be reproduced, such as a photographic positive or negative print, a photographic transparency, either positive or negative, or the like. By the term "screened relief pattern," as used herein and in the appended claims, is meant a pattern in which regularly spaced portions of the surface are removed, the area of the removed portions in any elemental portion of the print varying with the shade values of the corresponding elemental portion of the image to be reproduced, the best known example of such a screened relief pattern being the half-tone photo-engraved plate. By the term "printing processes," as used herein and in the appended claims, is meant any process by which a plate carrying a screened relief pattern may be utilized to produce multiple reproduced images, of which the most usual example is the conventional printing process.

The machine of Fig. 1 includes plate and image sheet supports, specifically, a cylinder **10** on which is supported or secured in any suitable manner a plate **11** of deformable material and a second cylinder **12** on which is supported or secured an image sheet **13**. By the term "deformable material" is meant a material that may be cut, gouged, decomposed or otherwise deformed by an engraving tool or stylus to form an image-reproducing plate. The plate and cylinder assembly **10**, **11** may be of any suitable type, but preferably is of the type described and claimed in applicant's copending application, Serial No. 40,595, filed concurrently herewith. The image sheet **13** for use in the machine specifically described hereinafter is a photographic positive print.

The machine of Fig. 1 includes means for rotating the cylinders **10** and **12** synchronously and preferably isochronously. Specifically, this rotating means includes a common shaft for the two cylinders including portions **14a**, **14b** coupled by a disengageable coupling **15**. The coupling **15** includes a notched disc **15a** and a complementary disc **15b** provided with a pin **15c** adapted accurately to engage the notch of disc **15a** when these discs are moved axially by a lever **15d** to effect engagement of the coupling. This pin-type coupling ensures engagement of the two shaft portions **14a**, **14b** in a predetermined phase relationship so that they rotate isochronously. The shaft **14a** is connected to be driven by a motor **16** which may be of any suitable type, although if a number of machines are to be operated in multiple, as described hereinafter, the motor must be of the synchronous type. The driving connection from the motor **16** to the shaft **14a** includes a flexible coupling **17** of any suitable type which mechanically filters or smoothes out any pulsation characteristic of the driving motor **16**. This driving connection further includes a worm **18** and engaging worm gear **19** and an over-running or one-way drive clutch **20**, the driving element of which is connected to gear **19** and the driven element of which is connected to shaft **14a**. On the drive shaft **14a** is a heavy fly wheel **21** which ensures pulsationless rotation of the shaft **14a**, **14b** and the cylinders **10** and **12** regardless of irregularities which might otherwise result from the characteristics of the motor **16** or imperfections in the driving gears. The over-running clutch **20**, which may be of any conventional type, serves two purposes: (1) it allows the fly wheel **21** to decelerate normally upon de-energization of the driving motor **16** without imposing an undue back load on the speed-reducing gears **18**, **19** and (2) it permits manual rotation of the cylinders **10** and **12** during mounting of the respective plate **11** and image sheet **13** thereon, free of the driving gearing.

The machine of Fig. 1 also includes means, such as a reciprocable carriage **22** including an electro-optical system, for scanning an image sheet **13** on its supporting cylinder **12**. The electro-optical scanning system is shown schematically as including a light source **22a** having an optical system **22b** and a photocell **22c** provided with an optical system **22d** including an aperture stop to limit its field of view to an elemental area of the image sheet **13** and is disposed to receive only diffused reflection, that is, the angle of incidence of the axis of optical system **22b** at the image sheet **13** is not the same as the angle of reflection of the axis of the optical system **22d**. The machine further includes means, such as a reciprocable carriage **23** including a plate-deforming tool **24**, for scanning a plate **11** on its supporting cylinder **10**. By the term "plate-deforming tool," as used herein and in the appended claims, is meant a tool capable of deforming a plate **11** as by cutting, gouging, indenting, thermally decomposing, or the like. In the preferred embodiment of the invention, the tool **24** is a heated stylus for thermally decomposing incremental areas of the surface of the plate **11**, as described hereinafter. The carriages **22** and **23** reciprocate on parallel longitudinal guide rods **38** and **39**.

There is further provided a mechanism for reciprocating the carriages **22** and **23** in opposite directions to form a laterally inverted screen relief pattern on plate **11**. This mechanism includes a pair of spaced pulleys **25** and **26** and a tensioned inelastic belt, such as a steel tape **27**, supported on the pulleys. Tensioning of the tape **27** is effected by a stiff helical spring **28** joining its two ends. The pulley **25** is driven from shaft **14a** through double worm gearing **46**, **47** and **48**, **49**, the gear ratio being preferably so chosen that the pulley **25** makes one revolution for the complete normal range of travel of the carriages **22** and **23**. One of the carriages, preferably the carriage **23**, is adapted to be locked or secured (by means not shown) to the lower run of the tape **27**, while the other carriage **22** is provided with a releasable clamp disposed to engage the upper run of the tape **27** and including a manually operable element or knob **29**, by which the carriage **22** can be released from the tape **27** to permit adjustment of the carriage **22** independent of the carriage **23** upon disengagement of the pin coupling **15**. This adjustment is provided to permit accurate registration of the electro-optical system of the carriage **22** with an image sheet **13** on the cylinder **12** when initially setting up the machine.

The carriage **23** includes a tool-actuating assembly **30** for driving the plate-deforming tool **24**. As shown in Fig. 2, the assembly **30** includes means for determining its neutral position with respect to the plate **11** on the cylinder **10**. This means is in the form of a resilient hairpin **31** having one arm secured to the assembly **30** and carrying at the end of the other arm a shoe **32** disposed to engage a plate **11** on the cylinder **10**. The separation of the arms of the hairpin **31** may be adjusted to adjust the neutral position of the shoe **32** by means of a thumb nut **33** threaded in the other arm of the hairpin **31**.

The tool-actuating assembly **30** also includes means for biasing the tool to an inoperative position. To this end, the assembly **30** is mounted on a platform **34** which is pivoted on the carriage **23** as by a pivot pin **35**. About the pivot pin **35** is secured a stiff helical biasing spring **36** with extending portions acting on the platform **34** and carriage **23** to bias the carriage **30** for pivotal movement in a clockwise direction about the pivot pin **35**. Secured to the under side of the carriage **23** is an electromagnet **37**, for which the pivoted platform **34** acts as an armature. As described hereinafter in connection with the circuit diagram of Fig. 5, the electromagnet **37** is normally excited to attract the platform **34** and retain the shoe **32** and the tool **24** in an operative relation with respect to the cylinder **10** and plate **11**. The tool-actuating assembly **30** also includes electromagnetic means connected to respond to the output of the electro-optical pick-up system **22a**—**22d** for actuating the tool **24**. This electromagnetic actuating means is shown more clearly in Figs. 3a and 3b, while its connection to the electro-optical pick-up system is described hereinafter with reference to the complete circuit diagram of Fig. 5.

The machine of Fig. 1 further includes a source of periodic pulsating potential or current, specifically, an electrical screen generator **40** driven synchronously with the cylinders **10** and **12** and connected to modulate the output of the pick-up system **22a**—**22d** for producing a pulsating excitation of the actuating means **30** at a screen frequency. Specifically, the generator **40** includes a toothed rotor element **40a**, mounted on and driven by the

shaft **14a**, thus eliminating any back-lash in the drive of the screen generator and ensuring absolute accuracy in the spacing of the screen dots. The generator also includes an independently rotatable toothed stator element **40b**. The teeth of the elements **40a** and **40b** are equally spaced about the outer and inner peripheries thereof, respectively, the number of teeth in each being determined by the desired "screen." For example, if a 120-screen plate is desired, each of the elements **40a** and **40b** will have $120/\sqrt{2}$ teeth within an angle of rotation corresponding to a peripheral travel of the stylus **24** of one inch on the plate **11**. The elements **40a** and **40b** are electrically insulated from each other and are connected in an electrical circuit to form the two elements of a condenser, as described hereinafter in connection with the complete electrical system of the machine.

There is also provided means for rotating the stator element **40b** at a speed of a lower order of magnitude than the rotor element. Specifically, there is provided a speed-reducing means between the shaft **14a** and stator element **40b**. This means includes a pulley **41** mounted on a shaft **42** supporting the stator element **40b**. Driving the pulley **41** is an endless belt **43** passing around a pair of guide pulleys **44** and a return pulley **45** disposed so that the upper run of the belt **43** is parallel with the path of movement of the carriage **23**. The belt **43** is connected to be driven by the carriage **23** as by a connection **43a**, as shown, and includes a tensioning spring **46** on the return side of its connection **43a**. Adjustment of the speed ratio may be determined by selection of the diameter of pulley **41** relative to the lead of the carriage **23**. The overall reduction is such that the speed of the stator element **40b** is a small fraction of the speed of the cylinders **10** and **12**. If a plate is desired in which the angle of the screen lines is 45°, as is customary, the speed of the stator element **40b** is that fraction of the speed of the cylinders **10** and **12** such that the stator **40b** rotates an angular distance equal to one tooth and space during the time that the cylinders **10** and **12** make two complete revolutions.

The details of construction of the stylus actuating mechanism **30** are best shown in the schematic perspective views, partly in section, of Figs. 3a and 3b. As shown, the magnetic circuit of the mechanism **30** is formed by two spaced opposed C-magnets **30a** and **30b**. Symmetrically disposed in the air gaps formed between the opposed legs of the C-magnets **30a** and **30b** is a vane-like magnetic armature **30e** about either end of which are disposed the actuating windings **30c** and **30d**, thus providing a balanced electromagnetic actuating mechanism.

In Fig. 3a the armature **30e** is shown in the unexcited or neutral position, while in Fig. 3b it is shown in one limiting actuating position corresponding to maximum excitation of the windings **30c** and **30d** of one polarity. An extension of armature **30e** is connected to the stylus **24** which is loosely supported for reciprocation in a projection **30j** of the casing **30**. Surrounding the stylus **24** is a noninductive heater **56** connected to and supported by terminals **57**. The casing of the mechanism **30** comprises a permanent magnet structure in which the side plates **30f** and **30g** are permanent magnet elements, while the end plates complete their magnetic circuit through the C-members **30a** and **30b**. The armature **30e** is mounted on a tension shaft **30h** rigidly supported from the casing. In Figs. 3a and 3b the dotted lines indicate the paths of the permanent magnet flux in the two positions of the armature member, while the dash lines represent the paths of flux due to the actuating windings **30b** and **30c**.

The actual physical construction of one embodiment of the apparatus represented in Figs. 1 and 2 is shown in Figs. 4a and 4b in which corresponding elements are identified by the same reference characters. Briefly, the whole apparatus is mounted on a base or bed plate **50**, the gearing **18**, **19** and **46–49**, the pulley **25**, the flywheel **21**, and the screen generator **40** being enclosed within an end housing **51**. The actuating mechanism **30** is enclosed within a housing **52** mounted on carriage **23**, while the electro-optical pick-up system is disposed within a housing **53** mounted on carriage **22**. The pin clutch **15** is disposed within a central bearing support **54** which includes the pin clutch **15** and its operating lever **15d**. The unit **54** also includes electrical switches and control members for the electrical system of the machine described hereinafter. The pulley **26** and the bearing for the right-hand end of the shaft **14b** are disposed in an end housing **55**. It will be understood, however, that the details of this mechanical construction and arrangement may be varied within wide limits to suit individual special requirements.

Referring specifically to Fig. 2 of the drawings, there is shown associated with the cylinder **10** and plate **11** a stroboscopic viewer for inspecting a plate while it is undergoing deformation. This viewer includes a portable microscope **60** disposed on a support **61** adjustably pivoted at **62** on a base **63** and thus adjustable for focusing on a plate **11**. The microscope **60** is included within an enclosing housing **64** which also includes a stroboscopic light source, such as a gaseous lamp **65** and an optical system **66** for focusing the light upon an elemental area of the plate **11** being examined. The lamp **65** is connected to a circuit for exciting it from the periodic source or screen generator **40**, as described hereinafter.

Referring now to Fig. 5 of the drawings, there is represented a circuit diagram, partially schematic, of the electrical system of the apparatus of Fig. 1, corresponding elements being identified by the same reference characters. Starting with the pick-up photocell **22c**, this is represented as a device of the conventional electron multiplier type, in which the several multiplier cathodes **22g** are connected to electrically spaced points on a voltage-divider resistor **70** connected between ground and the negative terminal of a unidirectional source −B. The anode of the cell **22c** is connected to a suitable source +B through a load resistor **71**, the signal across which is applied by way of a coupling condenser **72** to the input terminals of a photocell amplifier **73**, which may be of any suitable well-known type.

The output terminals of the amplifier **73** are connected to supply the amplified signal across a load resistor **74**. A low-pass inverse-feed-back network **75**, constituted for example by a series resistor **75a** followed by a shunt condenser **75b**, is connected from the output terminals of the amplifier **73** through a coupling condenser **76** to the input terminals thereof for eliminating the effect on the output signal of variations of the mean brightness of an image sheet on the mean position of the stylus **24**. As well understood in the art, such an inverse or negative feed-back of the low frequencies reduces the gain of the amplifier at such frequency to a very small value without appreciably affecting its response to the high-frequency components of the signal generated by the photocell **22c**.

The periodic source of generator **40** is connected to modulate the output signal of the pick-up system developed across the load resistor **74**. To this end, the generator **40** is connected as a variable condenser in the input circuit of a screen amplifier unit **77**; specifically, the rotor is connected to ground while the stator is connected to a source of polarizing voltage +B through an isolating resistor **76a**. The output of amplifier **77** is coupled through a condenser **78** to an additional amplifier unit **79**, the output of the amplifier **79** being connected through a coupling condenser **80** to a load resistor **81** provided with an adjustable tap or connection **82**. The signal at the tap **82** is applied to a scanner light amplifier **84**, which is a power amplifier for generating a periodic current synchronous with the periodic potential developed by the generator **40**. The current output of the amplifier **84** is connected to modulate the light source **22a** of the pick-up system; specifically, the lamp **22a** may be connected directly in the output circuit of the amplifier **84** to be excited thereby.

A second load resistor **85** is included in the output circuit of amplifier **79** and provided with an adjustable tap **86** from which a selected portion of the output signal is applied to a strobolight amplifier **87**, which is also a power amplifier for developing a periodic current pulse synchronous with the periodic potential generated by generator **40**. The gaseous discharge lamp **65** of the stroboscopic viewer is connected directly in the output of the amplifier **87**.

In order to permit a ready adjustment of the maximum and minimum penetrations of a plate **11** being deformed by the stylus **24** in accordance with the maximum and minimum shade values of the image being reproduced, there is provided a circuit for combining an adjustable portion of the output of the screen generator **40** with an adjustable portion of the output from the photocell **22c** to energize the actuating mechanism **30**. To this end, the output of the amplifier **77** is applied also

through a coupling condenser 88 to a load resistor 89 having an adjustable tap 90. The load resistor 74 of the amplifier 73 has an adjustable tap 91 and the taps 90 and 91 are interconnected through isolating resistors 92 and 93 and a switch 105, the junction of resistors 92 and 93 being connected to an isolating amplifier 94 which, in turn, is connected to a power amplifier 95, the output of which is connected through a power transformer 96 to the serially connected windings 30c and 30d of the stylus actuating mechanism 30. In case it should be desired to operate the machine of the invention from a separate synchronized source of image signals from a local or remote source, there may be provided a voltage divider 103 having an adjustable tap 104 and connected to the source or supply terminal 106 at which such signals appear. The switch 105 may then be operated selectively to connect with the tap 104 or the tap 91.

In series with the windings 30c, 30d is a dropping resistor 97 having an adjustable tap 98, while across the secondary winding of transformer 96 is connected a voltage-divider resistor 99 having an adjustable tap 100. The taps 98 and 100 are interconnected through isolating resistors 101 and 102, the junction of which is connected back to the input circuit of the power amplifier 95. From the tap 100 is derived a signal potential which varies with, and is a fraction of, the potential across the actuating windings 30c, 30d, while from the tap 98 is derived a potential varying with the signal current through the windings. These two signals are combined and fed back to the input circuit of amplifier 95 as an inverse feedback for linearizing the overall characteristics of the amplifier 95 and actuating mechanism 30 and for effectively controlling the output impedance of amplifier 95 to obtain a desired degree of damping of the actuating mechanism 30. The unidirectional sources for the several amplifier units of the circuit of Fig. 5 are represented collectively as +B, although the sources of the several amplifiers may be of different potential values according to the tube types and circuit constants of each amplifier. It will be understood that each of the several amplifiers described may be of any suitable conventional type of one or more stages, as required.

The general electrical power circuit for the system is represented at the top of Fig. 5. Power for the unit as a whole may be conventional 60-cycle, 110-volt power applied to the input terminals 110. The lower terminal 110 is connected to a bus 111 common to the power and control mechanisms hereinafter described. The upper terminal 110 is connected to a control line 112 through a manually operable off-on switch 113; a pair of limit switches 114 and 115 disposed in the path of travel of carriages 22 and 23 (not shown) for interrupting the electrical circuit in case either carriage reaches its limit of travel; the normally open contacts 116 of a safety microswitch mounted on the platform 34 and adapted to be closed initially by manual operation of the tool-actuating assembly 30 to operative position to complete a holding circuit for electromagnet 37; normally closed contacts of a push button stop switch 118; and the normally closed contacts 119 of a relay 120. The relay 120 is connected in the anode circuit of a vacuum-tube amplifier 121, the control electrode of which is connected to the output circuit of amplifier 79 and includes a conventional grid leak 122 and grid condenser 123. The relay 120 and amplifier 121 are adjusted so that the relay 120 maintains its contacts closed whenever normal potential is supplied from the screen generator 40 through the amplifiers 77 and 79. Thus, the elements 120, 121 constitute means responsive to the failure of the source, specifically, to the failure of rotation of the generator 40, for interrupting the control circuit 112, which deenergizes holding magnet 37, permitting the biasing spring 36 to actuate the tool 24 to inoperative position.

The contacts 119 of relay 120 complete a circuit to the holding magnet 37 of the actuating mechanism 30 through a resistor 124 and a rectifying device such as a contact rectifier 125, the winding 37 being by-passed by a condenser 126. Connected between the buses 111 and 112, immediately following the off-on switch 113, is a current transformer 127, the primary winding of which is connected in series with a constant-current ballast tube 128. The secondary winding of transformer 127 is connected directly to the heater 56. Following the contacts 116 of the safety switch, the motor 16 is connected between the buses 111 and 112. While the motor 16 may be of any suitable type, it is shown as a split-phase condenser motor of the hysteresis synchronous type, having one winding 16a connected directly between the power buses and a second winding 16b connected therebetween through a phase-splitting condenser 129. At this same point, a power rectifier unit 130 is connected between the buses 111 and 112. The unit 130 may be of any conventional type for converting the alternating-current supply to a unidirectional current of required operating potentials, indicated collectively by the reference +B.

Coming now to the operation of the apparatus described and referring first to the mechanical operation of the apparatus of Fig. 1, it will be seen that initially a plate to be engraved or deformed is mounted on cylinder 10 in any convenient manner, as by the method described in applicant's aforesaid copending application, Serial No. 40,595. The pin clutch 15 is disengaged and the image sheet is then mounted on cylinder 12 in any suitable manner. For this purpose, the carriage 22 may be unclamped from the belt 27 by means of the release knob 29. The carriage 22 may then be adjusted longitudinally to obtain proper registration of the pick-up system 22a—22c with the image sheet. The pin clutch 15 is then engaged to ensure a direct driving connection between the shaft portions 14a and 14b and further to ensure correct phasing of the cylinders 10 and 12.

The cylinders 10 and 12 may be manually rotated by virtue of the slip clutch 20 and the mechanism may be operated until the stylus 24 registers with a margin of the plate to be engraved. The stroboscopic viewer shown in Fig. 2 is then disposed to obtain a microscopic view of the elemental area of the plate 11 in registry with the stylus 24 and, with the electro-optical system in operation as described hereinafter, the deforming or decomposing of the plate 11 by the stylus 24 is observed when the electro-optical pick-up system views the darkest and lightest portions of the image sheet to be reproduced. Adjustments of the electrical system are then made, as described hereinafter, to obtain the appropriate minimum and maximum penetrations of the plate 11 by the stylus 24 corresponding to the darkest and lightest shade values present in the image sheet, respectively.

The cylinders 10 and 12 and their associated mechanism are then operated manually to place the electro-optical pick-up system at the starting corner of the image to be reproduced. The electrical system is then put in operation and is effective automatically to cause the electro-optical pick-up system to scan the image sheet in a spiral path and simultaneously to cause the stylus 24 to scan the plate 11. When the cylinders 10 and 12 are effectively on a common shaft, so that they rotate isochronously in the same direction, the carriages 22 and 23 move at equal speeds in opposite directions, due to the fact that they are clamped to opposite runs of the tape 27, as described above, the result is that the image reproduced on the plate 11 is laterally inverted with respect to the image sheet, so that when it is turned over it will reproduce the image in its correct relation.

Rotating simultaneously with the cylinders 10 and 12 and at the same speed is the rotor element 40a of the screen generator 40. This generator, as described hereinafter, is effective to modulate the light source 22a of the electro-optical system and the constants of the system are selected so as to procure substantially complete modulation, that is, so that the light source 22a is substantially completely extinguished at the frequency of the screen generator. The output of the photocell 22c is thus likewise modulated and, after amplification and the suppression of the unidirectional component, is applied as a signal-modulated carrier wave to the windings 30c and 30d of the actuating mechanism 30. This excitation of the windings 30c and 30d causes the stylus to oscillate about its mean or neutral position at the frequency of the signal developed by the screen generator 40, while the amplitude of the oscillation is varied or modulated in accordance with the amplitude of the signal developed by the photocell 22c which, in turn, varies with the shade values in the successive incremental areas of the image sheet being scanned. As stated above, the plate 11 is preferably of a decomposable material, such as cellulose nitrate, while the stylus 24 is heated to a temperature of the order of 1200° F. by the heater 56 so that, as it oscillates into contact with the plate 11, the stylus removes portions of the plate by thermal decomposition, forming pits of depth and surface area varying with the amplitude of the oscillation of the stylus 24 and thus with the variations in the shade value of the image sheet. As a result, there is formed on the surface of the plate 11 the equivalent of a half-tone structure comprising a series of elemental dots separating a series of pits formed by the oscillating stylus 24.

For proper image reproduction, the screen structure of the plate 11 should, for the lightest shade presented in the image being reproduced, contain a complete series of dots or islands separating the pits but of minimum area. Conversely, when scanning the darkest portion of the image sheet, a complete series of pits of minimum surface area should be formed. In order to secure this result, certain adjustments of the electrical system are made, as described hereinafter, to ensure that the amplitude of the pulsating excitation from the screen generator 40 is so proportioned to the constants of the actuating means 30 that the following relationships are satisfied:

(1) The mean penetration of the plate 11 by the tool 24 is of the same order of magnitude as the neutral separation of the tool and the plate.

(2) The amplitude of the pulsating excitation from the screen generator 40 is so proportioned to the response of the electro-optical pick-up system that the minimum penetration of the tool, corresponding to one shade extreme in the image, for example, black, is of the order of ⅕ of its maximum penetration, corresponding to the other shade value, for example, white.

(3) The rotational speed of the cylinders 10 and 12 is so related to the frequency of excitation from the screen generator 40 that the peripheral travel of the plate cylinder 10 during one period of the screen-frequency excitation is approximately twice the line spacing. For example, if it is desired to produce a 120-line halftone plate, the cylinder 10 should travel $1/60\sqrt{2}$ inch during one period or cycle of the screen frequency.

The foregoing relationships are represented in Fig. 1a, in which the line b represents the development of the surface of plate 11, while the line a represents the relative path of travel of the neutral position of the tool 24. In this figure, curve c represents one cycle of screen frequency modulated to minimum amplitude corresponding to a black shade in the image being scanned, while curve d represents another cycle of the screen frequency modulated at maximum amplitude corresponding to a white portion of the picture being scanned. The relative dimensions of the various parameters of one machine embodying the invention are presented in Fig. 1a and it will be seen that these relative dimensions satisfy the first two of the foregoing relations; that is, the excursion of curve c below the line b, representing the minimum penetration of the stylus, is approximately one-fifth the excursion of curve d below line b, representing the maximum penetration of the stylus, while the mean value of these two excursions is of the same order of magnitude as the separation of the lines a and b representing the neutral separation of the stylus and the plate. It will also be seen that, since the unidirectional component of the modulated signal is suppressed so that only a pure alternating current signal is applied to the windings of the actuating mechanism 30, only the negative half of each cycle of screen frequency is effective to actuate the tool 24 into penetration of the plate 11. Therefore, the surface of plate 11 on cylinder 10 must travel a distance equal to the spacing of adjacent lines in the period from the commencement of one negative half cycle effective to form a pit of one line to the successive negative half cycle effective to form the next pit. This satisfies the third relationship above.

Turning now to Fig. 5 of the drawings, there will be taken up the operation of the electrical system of the machine of Fig. 1. In order to place the machine in operation, the on-off switch 113 is initially closed. This energizes the heater 56 through the current transformer 127 and the heaters of the various electron tubes. With the limit switches 114, 115 normally closed and after a reasonable warm-up time, the tool actuating assembly 30 is manually lowered to operative position, contacts 116 are closed, and the motor 16 is placed in operation to drive the various mechanical elements of the machine of Fig. 1, including the screen generator 40. Simultaneously, the power rectifier 130 is energized and supplies at its output terminals +B suitable unidirectional potentials for the several amplifiers of the system. When the apparatus has reached normal speed and the power rectifier is in operation, the screen generator 40 is effective to develop a periodic potential of the desired frequency which is amplified in the units 77 and 79 and applied to the grid of amplifier tube 121. Initially tube 121 has zero bias and is fully conductive, energizing relay 120 to hold open its normally closed contacts. However, when the screen-frequency signal is applied to the grid of tube 121, it is self-biased by grid rectification substantially to cut-off de-energizing relay 120 to close its contacts 119. Up to this time, the platform 34 must be held down manually. Upon the closing of contacts 116 and 119, however, the electromagnet 37 is energized with unidirectional current through the rectifier 125. The electromagnet then attracts its armature 34 to hold the actuating mechanism into engagement with the plate 11 on cylinder 10. The machine is now in full operation for forming an image on the plate 11.

As stated above, initially the tool 24 is operated to a margin of the plate 11 for forming a test pattern on such margin, while observed by the stroboscopic viewer, as shown in Fig. 2. The neutral position of the tool 24 is adjusted by adjusting the shoe 32 by the knob 33 (Fig. 2) to the desired relation, as represented in Fig. 1a. In view of the fact that the output of the screen generator 40 as amplified in units 77, 79, and 87 is applied to the gaseous discharge lamp 65 of the stroboscopic viewer, this lamp illuminates in synchronism with the lamp 22a of the electro-optical pick-up system, so that the elemental portion of the plate 11 being viewed is illuminated only for brief intervals synchronous with the peaks of the modulated screen frequency, this is, with the points of maximum penetration of the tool 24. As is well understood in the art, the observer thus obtains an apparently stationary view of the minute portion of the plate penetrated by the tool 24.

Initially the minimum penetration or deformation of the plate is adjusted to correspond to the black level or darkest shade in the image sheet being scanned. This initial adjustment is made by tap 90 of voltage divider 89 which adjusts the minimum amplitude of the screen-frequency signal amplified and applied to the actuating mechanism 30. This adjustment may be made substantially independently of the signal from the electro-optical pick-up system, since that signal for black shade levels is an inappreciable fraction of the amplitude of the signal from the screen generator 40.

The pick-up system is then adjusted to a portion of the image of maximum brightness, for example, white, and the tap 91 of the voltage divider 74 in the output of the amplifier 73 is then adjusted to obtain the desired maximum penetration in accordance with the relationships of Fig. 1a. The operation of the system with the switch 105 connected to the external source of image signals 106 is in all respects the same, it only being necessary that such signals be derived from a pick-up system, either local or remote, operating synchronously with the pick-up carriage 22 of Fig. 1.

By way of example only, there may be given the following specifications of one machine constructed in accordance with the invention and providing satisfactory operation:

Screen	65 lines per inch.
Screen frequency	350 cycles per second.
Speed of cylinders 10, 12	50 R. P. M.
Lead	$1/65\sqrt{2}$.
Mesh	$65\sqrt{2}$.
Stylus 24	Radial to cylinder.
Stylus taper angle	75°.

Thus, there is provided by the invention a machine for producing on a plate a screened relief pattern from an image sheet which virtually eliminates all skill or technique previously required to produce half-tone engravings. Furthermore, the machine of the invention produces such plates in only a small fraction of the time required for conventional photo-engravings. For example, it has been found possible to produce a plate 8 x 10" of 65 screen in eighteen minutes. The machine is capable of extreme accuracy of reproduction of intermediate shade values between full black and full white. At the same time, all chemicals and necessary facilities for handling them are eliminated. By the use of the stroboscopic viewer as described, it is possible to determine in advance the desired contrast range of the resultant plate. This is in marked contrast to the conventional chemical processes which generally require repeated trials before the desired contrast range is obtained. Further, by the simple operation of switch **105** of Fig. 5, it is possible to adapt the machine of the invention to operation from image-representing signals received by radio or wire from remote synchronously scanned sources.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first cylinder for supporting a plate; a second cylinder for supporting an image sheet; means for rotating said cylinders synchronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second cylinder; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first cylinder; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; an electrical screen generator including a rotor element driven synchronously with said cylinders and an independently rotatable stator; and means for rotating said stator at a speed of a lower order of magnitude than said rotor element; the output of said generator being connected to modulate the output of said pick-up system.

2. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first cylinder for supporting a plate; a second cylinder for supporting an image sheet; means for rotating said cylinders; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second cylinder; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first cylinder; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; an electrical screen generator including a rotor element driven synchronously with said cylinders and an independently rotatable stator; and means for rotating said stator at a fraction of the speed of said cylinders equal to one-half the ratio of the speed of said cylinders to the screen frequency; the output of said generator being connected to modulate the output of said pick-up system.

3. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first cylinder for supporting a plate; a second cylinder for supporting an image sheet; means for rotating said cylinders isochronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second cylinder; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first cylinder; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages isochronously; an electrical screen generator including a rotor element driven directly by said shaft and a rotatable stator element; and a speed-reducing gear connected to drive said stator from said shaft; the output of said generator being connected to modulate the output of said pick-up system.

4. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first [cylinder] *member* for supporting a plate; a second [cylinder] *member* for supporting an image sheet; means for [rotating said cylinder] *moving said members* synchronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second [cylinder] *member*; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first [cylinder] *member*; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; said pick-up system including a light source; and a source of pulsating current of screen frequency connected to modulate said light source synchronously with the scanning of the image sheet.

5. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first [cylinder] *member* for supporting a plate; a second [cylinder] *member* for supporting an image sheet; means for [rotating said cylinders] *moving said members* synchronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second [cylinder] *member*; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first [cylinder] *member*; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; said pick-up system including a gaseous electrical discharge lamp; and a source of pulsating current of screen frequency connected to modulate the excitation of said lamp synchronously with the scanning of the image sheet.

6. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first [cylinder] *member* for supporting a plate; a second [cylinder] *member* for supporting an image sheet; means for [rotating said cylinders] *moving said members* synchronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second [cylinder] *member*; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first [cylinder] *member*; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; said pick-up system including a light source; a periodic potential generator of screen frequency; and a power amplifier for generating a periodic current synchronous with said periodic potential and connected to modulate said light source synchronously with the scanning of the image sheet.

7. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a first [cylinder] *member* for supporting a plate; a second [cylinder] *member* for supporting an image sheet; means for [rotating said cylinders] *moving said members* synchronously; a first reciprocable carriage including an electro-optical pick-up system disposed for scanning an image sheet on said second [cylinder] *member*; a second reciprocable carriage including a plate-deforming tool disposed for scanning a plate on said first [cylinder] *member*; means responsive to the output of said pick-up system for actuating said tool; means for reciprocating said carriages synchronously; said pick-up system including a gaseous electrical discharge lamp; a periodic potential generator of screen frequency; and a power amplifier for generating a periodic current synchronous with said periodic potential and connected to excite said lamp synchronously with the scanning of the image sheet.

8. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of synchronously [rotatable cylinders] *movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a mechanism for reciprocating said carriages synchronously in opposite directions to obtain an inverted relief pattern comprising: a pair of spaced pulleys; a tensioned inelastic belt supported on said pulleys; one of said carriages including means for locking it to one run of said belt and a releasable clamp on the other of said carriages disposed to engage the other run of said belt.

9. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of synchronously [rotatable cylinders] *movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respec-

tively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a mechanism for reciprocating said carriages synchronously in opposite directions to obtain an inverted relief pattern comprising: a pair of spaced pulleys; a tensioned steel tape supported on said pulleys; one of said carriages including means for locking it to one run of said tape and a releasable clamp on the other of said carriages disposed to engage the other run of said tape.

10. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of [rotatable cylinders] *synchronously movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a common drive [shaft] *element* for said [cylinders] *members* including a disengageable coupling; a mechanism for reciprocating said carriages synchronously in opposite directions to obtain an inverted relief pattern comprising: a pair of spaced pulleys; a tensioned inelastic belt supported in said pulleys; one of said carriages including means for locking it to one run of said belt and a clamp on the other of said carriages disposed to engage the other run of said belt and releasable to permit independent adjustment of said other carriage upon disengagement of said coupling.

11. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of [synchronously rotatable cylinders] *synchronously movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a positioning and actuating mechanism for said plate-deforming tool comprising: a tool actuating assembly including a plate-deforming tool; means for determining the neutral position of said tool assembly; electromagnetic means connected to respond to the output of said pick-up system for actuating said tool; and means for producing a pulsating excitation of said actuating means at a screen frequency; the amplitude of said pulsating excitation being so proportioned to the constants of said actuating means that the mean penetration of a plate by said tool is of the same order of magnitude as the neutral separation of said tool and its plate.

12. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of [synchronously rotatable cylinders] *synchronously movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a positioning and actuating mechanism for said plate-deforming tool comprising: a tool actuating assembly including a plate-deforming tool; means for determining the neutral position of said tool assembly; electromagnetic means connected to respond to the output of said pick-up system for actuating said tool; and means for producing a pulsating excitation of said actuating means at a screen frequency; the amplitude of said pulsating excitation being so proportioned to the response of the pick-up system that the minimum penetration of said tool corresponding to one shade extreme in said image is of the order of one-fifth its maximum penetration corresponding to the other shade extreme.

13. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of [synchronously rotatable cylinders] *synchronously movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said image-sheet [cylinder] *member* and said plate [cylinder] *member*, a positioning and actuating mechanism for said plate-deforming tool comprising: a tool actuating assembly including a plate-deforming tool; means for determining the neutral position of said tool assembly; electromagnetic means connected to respond to the output of said pick-up system for actuating said tool; and means for producing a pulsating excitation of said actuating means at a screen frequency; the speed of said [cylinders] *members* being so related to the frequency of said excitation that the [peripheral] travel of said [cylinders] *members* during one period of said excitation is approximately twice the desired line spacing.

14. In a machine for producing on a plate from an image sheet a relief pattern suitable for image reproduction by printing processes and including a pair of [synchronously rotatable cylinders] *synchronously movable members* for individually supporting a plate and an image sheet and a pair of reciprocable carriages individually including a pick-up system and a plate-deforming tool for respectively scanning said plate [cylinder] *member* and said image-sheet [cylinder] *member*, a positioning and actuating mechanism for said plate-deforming tool comprising: a tool actuating assembly including a plate-deforming tool; means for biasing said tool assembly into engagement with said plate cylinder; said tool assembly including an adjustable shoe engaging a plate on said plate [cylinder] *member* for determining the neutral position of said tool; electromagnetic means connected to respond to the output of said pick-up system for actuating said tool; and means for producing a pulsating excitation of said actuating means at a screen frequency.

15. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: a plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a periodic electrical screen generator connected to modulate the output of said pick-up system; and means for adjusting the output of said generator to adjust the minimum deformation of said plate corresponding to the black level of an image sheet.

16. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system including a light source for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a periodic electrical screen generator connected to modulate said light source; and means for applying an adjustable portion of the output of said generator to said tool actuating means to adjust the minimum deformation of said plate corresponding to the black level of an image sheet.

17. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system including a light source for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; a first amplifier coupled to the output of said pick-up system; a periodic electrical screen generator; a second amplifier coupled to said generator; and means responsive jointly to the outputs of said amplifiers for actuating said tool.

18. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system including a light source for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; a first amplifier coupled to the output of said pick-up system; a periodic electrical screen generator; a second amplifier coupled to said generator; means for combining adjustable portions of the outputs of said amplifiers; and means responsive to said combined outputs for actuating said tool.

19. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its sup-

port; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a periodic electrical screen generator connected to modulate the output of said pick-up system; and means for adjusting the output of said pick-up system to adjust the maximum deformation of said plate corresponding to the white level of an image sheet.

20. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool, a periodic electrical screen generator connected to modulate the output of said pick-up system; means for adjusting the output of said generator to adjust the minimum deformation of said plate corresponding to the black level of an image sheet; and means for adjusting the output of said pick-up system substantially independently to adjust the maximum deformation of said plate corresponding to the white level of an image sheet.

21. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system including a light source for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; a first amplifier coupled to the output of said pick-up system; a periodic electrical screen generator; a second amplifier coupled to said generator; means for combining the outputs of said amplifiers; means responsive to said combined outputs for actuating said tool; means for adjusting the output of said generator amplifier to adjust the minimum deformation of said plate corresponding to the black level of an image sheet; and means for adjusting the output of said pick-up system amplifier to adjust the maximum deformation of said plate corresponding to the white level of an image sheet.

22. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a source of periodic potential connected to modulate the output of said pick-up system; and means responsive to the failure of said source for actuating said tool to an inoperative position.

23. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means for biasing said tool to an inoperative position; a normally excited electro-magnetic means for retaining said tool in an operative position; means responsive to the output of said pick-up system for actuating said tool; a source of periodic potential connected to modulate the output of said pick-up system; and means responsive to the failure of said source for deenergizing said electromagnetic means.

24. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on it support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means including an amplifier responsive to the output of said pick-up system for actuating said tool; a filter network coupled to said amplifier for eliminating the effect of variations of the mean brightness of an image sheet on the mean position of said tool; and a source of periodic potential of screen frequency connected to modulate the output of said pick-up system.

25. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means including an amplifier responsive to the output of said pick-up system for actuating said tool; a low-pass inverse feed-back network coupled to said amplifier for eliminating the effect of variations of the mean brightness of an image sheet on the mean position of said tool; and a source of periodic potential of screen frequency connected to modulate the output of said pick-up system.

26. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a source of periodic potential of screen frequency connected to modulate the output of said pick-up system; and a stroboscopic viewer for said plate including a light source energized from said source.

27. A machine for producing on a plate from an image sheet a screened relief pattern suitable for image reproduction by printing processes comprising: plate and image-sheet supports; means including an electro-optical pick-up system for scanning an image sheet on its support; means including a plate-deforming tool for scanning a plate on its support synchronously with said first scanning means; means responsive to the output of said pick-up system for actuating said tool; a source of periodic potential of screen frequency connected to modulate the output of said pick-up system; a portable microscope adjustable for focusing on a plate undergoing deformation and including a stroboscopic light source; and a circuit for exciting said light source from said periodic source.

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March 7, 1933. K. C. D. HICKMAN 1,900,877

NONHALATION MOTION PICTURE FILM

Filed May 13, 1931

Fig.1.

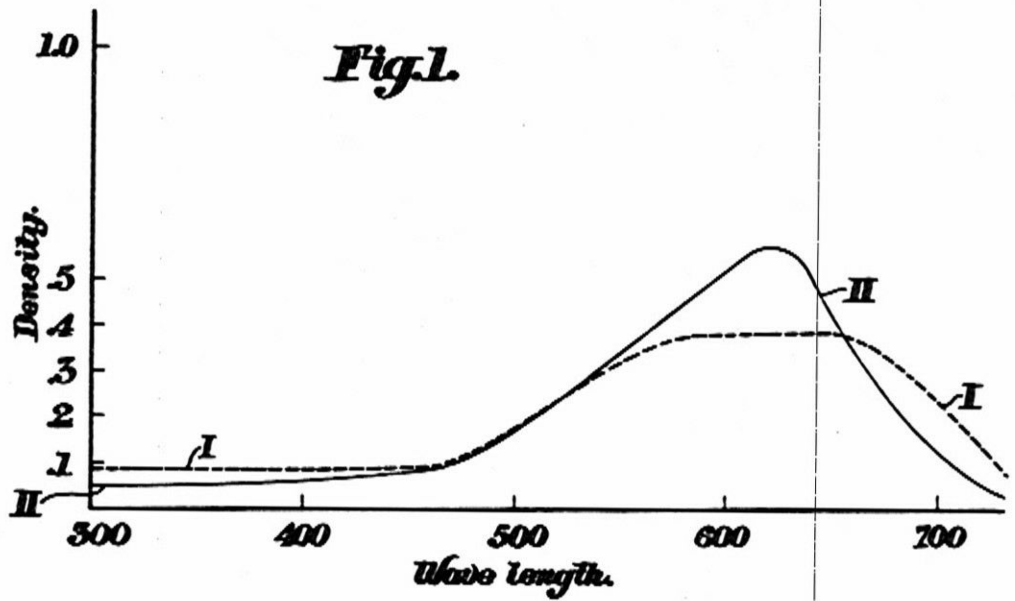


Fig.2.

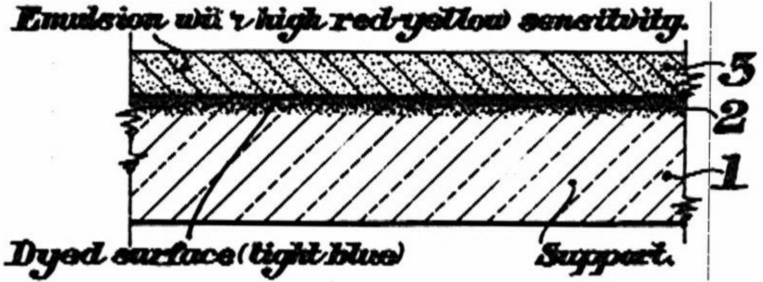
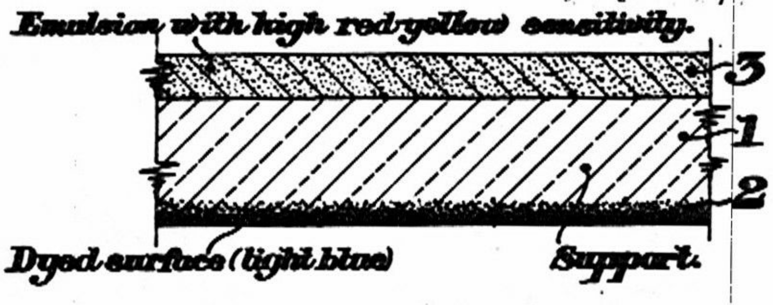

Emulsion with high red-yellow sensitivity.
3
2
1
Dyed surface (light blue)
Support.

Fig.3.


Emulsion with high red-yellow sensitivity.
3
1
2
Dyed surface (light blue)
Support.

Inventor,

Kenneth C.D. Hickman,

By

Attorney

Patented Mar. 7, 1933 **1,900,877**

UNITED STATES PATENT OFFICE

KENNETH C. D. HICKMAN, OF ROCHESTER, NEW YORK, ASSIGNOR TO EASTMAN KODAK COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK

NONHALATION MOTION PICTURE FILM

Application filed May 13, 1931. Serial No. 537,048.

This invention relates to non-halation motion picture film and in particular to the use therein of a permanent layer having light-absorbing qualities in certain defined regions of the spectrum, rendering the film particularly useful under present conditions of motion picture film practice. The usefulness of the invention which I will describe depends, first, on recent advances in the manufacture of sensitive photographic emulsion whereby negative emulsions are often highly, and sometimes predominantly, sensitive to regions of the spectrum to which negative material has been hitherto relatively insensitive, and, second, to the practice in motion picture studios of using artificial light sources which are comparatively poor in the blue rays. Since the negative emulsions formerly used, even when described as panchromatic, were predominantly sensitive in the blue, while the light sources such as incandescent electric bulbs were poorest in this region, it was necessary to use very powerful lights in order to take the pictures at the necessary speed.

The modern emulsions are much more highly sensitive to the yellow-green and red portions of the spectrum than the older ones, and since the light from the incandescent bulbs is particularly rich in rays in this portion, it follows that with unbacked film halation is due almost entirely to the rays of these colors reflected within the support and that the trifling halation which will be caused by the relatively small amount of blue light may be practically neglected so far as the resulting halation is concerned.

Thus, an approximate remedy for halation can be secured by incorporating on either side of, or in the substance of, the film support, a blue dye which will absorb light more or less uniformly throughout the entire visible spectrum, with the exception of a region in the extreme blue. It is a natural property of most blue dyes or mixtures of dyes which result in a blue color that, even in those regions of the spectrum where the transmission is at its maximum, there is, nevertheless, a considerable absorption. In accordance with this invention, I contemplate incorporating a dye layer, which will have a density in the blue region where the transmission is greatest, of between .01 and .15 preferably with a density of .1, and I contemplate that the dye layer shall have a density greater that .3 in the other regions of the spectrum and I prefer that the absorption bands shall meet the transmission band with a sharp cut. The density is defined by the following equation:

$$D=\log\frac{1}{T}$$

where D is density and T is light transmission expressed in the percentage of the light transmitted with respect to the light falling upon the material to be measured.

It is furthermore desirable that it shall not be necessary to dissolve, remove, bleach or destroy the dyes during photographic processing. For the purposes described by me, it is unnecessary that this be done, since positive film, upon which the pictures to be projected are printed, is customarily sensitive only to the blue and ultra-violet and since the anti-halation layer which I utilize transmits rather freely in these regions, it does not interfere with the printing as now customarily practiced.

I have found that mixtures of dyes are generally preferable to single dyes, though I do not exclude the latter. Single dyes which may be used are the following: Spirit blue R (General Dyestuffs, Inc.), Grasol blue, Diazine green. In actual coating 2½ parts of the dye may be mixed with 1000 parts of an equal solvent mixture of acetone and methyl alcohol. An example of a mixture is Spirit blue R and alphazurine with the same solvents.

Another example of a suitable mixture of dyes is given by a solution containing one part of fuchsine and one part of alphazurine in 200 parts of a solvent consisting of equal parts of methyl alcohol and acetone. This may be applied on either side of the support during manufacture, employing any of the well known means for the application of the dye. The solvent will penetrate the support sufficiently to embody permanently the dye in the surface thereof, so that it will not be removed in the ordinary photographic processes, such as are employed in the continuous machines now customarily employed for motion picture purposes.

Film tinted with the mixture just described has a light steel blue color, and, when coated with emulsion, may be exposed in the camera, yielding images which are indistinguishable from the images taken on ordinary film except that those defects which are attributable to halation are absent. Of course, due to the greater speed of the emulsion in the region to which film has hitherto been comparatively insensitive, the amount of illumination and, consequently, heat required may be greatly cut down, thus adding materially to the comfort of the actors.

This blue backed negative film may then be printed in the ordinary manner and will offer so little extra obstruction to the active rays in the printing light that a negative strip made up of scenes taken on this film and ordinary film may be printed continuously with no perceptible alteration in the density from one to the other of the resulting prints. By this I mean to say that, while difference in density could be revealed by sensitive densitometric tests and might be just perceptible in picture form to the skilled eye, the variation would be so much less than one step on the printer that it would not be considered necessary to make any special printing adjustment for this cause. By way of illustration, I will refer to the accompanying drawing in which Fig. 1 is a diagram showing the absorptive characteristics of the dye layer, and Figs. 2 and 3 are sections of film embodying my invention.

In Fig. 1 the dotted curve I is the absorption curve for the described mixture of alphazurine and fuchsine and the full line curve II is the absorption curve for Spirit blue R.

As shown in Fig. 1, it will be seen that the absorption is relatively high for light of the longer wave lengths in the visible portion of the spectrum and is rather low in the blue and decreases still further in the ultra-violet, where it may be as low as possible.

Since there is substantially no ultra-violet light emitted from incandescent bulbs by the light of which the exposures are made, it is obvious that little halation will result, while it is possible to print through the negative with the dye layer intact.

In Fig. 2 is shown the support, the surface of which at 2 is dyed with a light blue layer of the type described and carries an emulsion with high red-yellow sensitivity.

In Fig. 3 the same emulsion is shown on the opposite surface from the dye, the figures being otherwise the same.

In addition to the advantages and objects already described, it has been found that film embodying this invention greatly improves the definition in contrasty images and that furthermore the incorporation of a permanent light blue tint forms a ready means of identifying this film after development and prevents it becoming mixed with the many other specialized films which are found in a cutting room since the introduction of sound pictures. Moreover, the absence of a detachable backing layer on the unexposed film entirely removes the possibility of color abrasion in the slitting and perforating operation during manufacture and in the gate of the camera during exposure. For all of these reasons, this film has been found of great utility at all points in its use in modern methods of making motion pictures.

Having thus described my invention, what I claim as new and desire to be secured by Letters Patent of the United States is:

1. A motion picture negative film adapted for use in making exposures under illumination particularly rich in light of the longer visual wave lengths and comprising a support and a photographic layer thereon highly sensitive to light of the longer visual wave lengths, said support carrying a dye layer having a density in the blue region of the spectrum not greater than .15 and throughout the other visual portions of the spectrum greater than .3, the dye being unaffected by ordinary photographic processes.

2. A motion picture negative film adapted for use in making exposures under illumination particularly rich in light of the longer visual wave lengths and comprising a support and a photographic layer thereon highly sensitive to light of the longer visual wave lengths, a dye layer having a high transmission to violet and ultra-violet and having a density in the blue region between .01 and .15 and in the other visual portion of the spectrum greater than .3, the dye being unaffected by ordinary photographic processes.

Signed at Rochester, New York, this 9th day of May, 1931.

KENNETH C. D. HICKMAN.

Patented May 8, 1934

1,957,888

UNITED STATES PATENT OFFICE

1,957,888

PROCESS FOR TINTING, DYEING OR BACKING PHOTOGRAPHIC FILM

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No Drawing. Application January 4, 1930,
Serial No. 418,652

9 Claims. (Cl. 95—9)

Cf Ref 20
re surface

This invention relates to a process of dyeing or treating photographic film base and to the product so produced.

It has been common practice to dye film by applying solutions of dyes in organic liquids which carry the dyes into the body of the film, the liquid usually being a partial solvent for the film base as well as for the dye. These dyes are usually applied after the process of film forming by a series of rolls which transfer the dye to one side of the film. This dyeing may be accomplished, of course, by immersing the film or running it through a dye bath, but usually it is desired to dye but one side of the film. Where a fugitive dye is required, as in applying color backings for motion picture positive film, leader strips or for anti-halation backings, this method has many disadvantages, since the dye is carried so far into the body of the film that it can usually not be removed easily, and can scarcely ever be removed quickly by water or the usual photographic baths.

An object of this invention is to render the film base capable of taking a dye.

Another object is to render the film capable of being dyed from substantially aqueous solutions if desired, to render it capable of absorbing fugitive dyes which will wash off readily in water or photographic baths, and to make it possible to dye such films more cheaply for certain purposes than is now possible. The tinted layer may be fugitive for the purpose of temporary backing, or it may be permanent, for the purposes for which such dyed film is usually employed.

My invention generally comprises three steps, which may be taken in series or two of them together. The steps are hydrolysis, mordanting and dyeing. By the first, the surface layer of the film base is partially changed chemically and more or less microscopically roughened. By the second, a substance is formed in this hydrolyzed layer, which substance is capable of fixing or mordanting the dye. The mordant may be formed in situ, it may be precipitated from the solution, or it may be absorbed mechanically from the solution. I contemplate as within the scope of my invention any substance soluble in either an alkali or a hydrolyzing bath and which reacts with the film to form in the surface a mordant.

The general method of carrying out my invention is as follows. I first subject the film to an alkaline hydrolyzing bath which may contain ammonium hydroxide, an alkali hydroxide, an alkali carbonate, or an alkali sulphide or a mixture of these. Certain powerful organic amines such as tri-ethyl-amine may also be used. When such baths act on cellulose esters, there is a saponifying action or deesterification at the surface, and an analogous chemical reaction with other cellulose compounds. After washing, the mordant is applied by immersing the film in a solution of tannic acid, potassium permanganate, copper ferrocyanide, nickel hydroxide, or a number of other substances which may be used for the purpose. The mordanting bath may be combined with the hydrolyzing bath to carry out both reactions in a single step. The film may then be dyed in any one of certain classes of dyes which are well known.

When the process of hydrolyzing and mordanting is carried out in two steps, I use for example a solution of four per cent sodium hydroxide, and the bath is raised to a temperature of preferably 70 degrees centigrade, at which temperature the hydrolysis may require as little as two seconds. The temperature used is purely a matter of convenience and may range from room temperature to 100 degrees centigrade.

However, I prefer not to use a temperature over 70 degrees so as to avoid distortion of the film base. After washing the film and preferably also scrubbing it to remove particles from the surface layer which would otherwise come off later, I then allow it to soak in a solution which furnishes the mordant and I can use for this purpose, for example, a solution of 10% tannic acid containing 0.1 per cent hydrochloric acid. The film is then ready for dyeing in an aqueous solution of a basic dye, such as basic magenta, malachite green or chrysoidine. The strength of the dye solution may be about one per cent, and to the solution may be added a trace of acetic acid.

As an example of a film base prepared for dyeing in one step, I may immerse the film in a solution of sodium hydroxide containing also from $\frac{1}{10}$ to 2 per cent of potassium permanganate. The temperature is kept at the same value as before. This solution simultaneously hydrolyzes and deposits in the surface layer of the film a mordanting substance, namely, manganese dioxide. Several other baths which may be used for the one step process are sodium hydroxide and aluminum hydroxide together in solution, or antimony sulphide in sodium hdyroxide and/or sodium sulphide.

The dyes to be used for dyeing the film after hydrolyzing and mordanting are usually those soluble in water or in the usual photographic baths, which dyes are more or less easily washed out by water or are bleached by the usual photographic baths, namely the developer or fixing baths. When a dye has the latter characteristic, it is usually known as "fugitive". It is not a necessary prerequisite that the dyes have these characteristics, as for certain purposes where a permanent tint or dye is required, it is obviously not necessary or desirable that the dye shall be fugitive or wash out afterwards. The dyes which I prefer to use are generally in the class of water soluble basic dyes, as this class offers a wider choice of colors. Dyeing from substantially aqueous solutions also has marked advantages in not causing distortion of the film base, leaving the dye relatively on the surface of the film so that it can be removed if desired, and causing less swelling of the base in the dyeing process. The solvents to be used for the dye are preferably water but they may be alcohol, some suitable solvent miscible with water, or any other solvent which may be useful in this method.

For example, a dye may be used which is soluble both in alcohol and water, such as basic magenta, in the following way. The dye bath is made up in alcoholic solution and the film is dyed from this bath. Later this dye may be removed if necessary or desirable by means of water or the usual treatment in photographic baths. In cases where the dye is afterwards to be removed from the film, this may occur in two ways; it may come out by solution and diffusion in a solvent of the dye, or it may come out by mechanical disintegration, that is, by a breaking up of the surface which holds the dye. This latter, for example, may be accomplished by removing the mordant which holds the dye. When a permanent tint is desired, the dye bath may consist of the dye and any suitable organic solvents which slightly attack the base, such as methyl alcohol or a higher alcohol with a true solvent such as acetone.

The process of hydrolyzing and mordanting, and the dyeing also, if desired, may be carried out continuously at the time the film base is first formed. After the film is formed and cured it can be then led into a special set of machines for the hydrolyzing and mordanting and/or dyeing.

These machines may be of the type now in use, with slight modifications, such machines comprising a plurality of rolls to carry the dye to the film surface or the hydrolyzing and modanting substances where possible, or a series of baths into which the film is run continuously. By this means the film base would be delivered either dyed or in a condition ready for dyeing.

My invention may be applied to any film composed of cellulose nitrate, cellulose acetate, or other ester, cellulose ether, or regenerated cellulose such as viscose. It is, however, particularly adapted to cellulose nitrate and cellulose acetate as now used.

This process offers several advantages. Film base may be dyed from substantially aqueous solutions, which has heretofore been difficult, but which offers many advantages over the older methods of dyeing from non-aqueous solvents which usually carry the dye far into the body of the film. By the use of this invention it is also easily possible to back film or dye it with a fugitive dye which is removed easily in the ordinary photographic baths. Such dyes can be applied as a color backing for the purpose for which such backings are usually employed.

For permanent tints on film base, for example, for motion picture positives, dyeing from aqueous solutions offers a much wider choice of colors. For certain other purposes in which film, coated with gelatin or other substances is ordinarily used for dyeing, this invention offers the advantages of lower cost and greater convenience in that the film base is directly dyed, thereby obviating the separate operation of coating with its attendant disadvantages.

What I claim is:

1. The process of hydrolyzing and mordanting a film support of plastic cellulosic material which comprises treating it with a hydrolyzing bath and potassium permanganate.

2. The process of hydrolyzing and mordanting a film support of plastic cellulosic material which comprises treating it with a solution of sodium hydroxide and potassium permanganate.

3. The process of hydrolyzing and mordanting a film support of cellulose nitrate which comprises treating it with a solution of approximately 4% sodium hydroxide and 0.1 to 2% of potassium permanganate.

4. The process of hydrolyzing and mordanting a film support of plastic cellulosic material which comprises treating it simultaneously with a hydrolyzing bath and a mordant selected from the group composed of tannic acid, potassium permanganate, antimony sulphide, aluminum hydroxide, copper ferrocyanide, and nickel hydroxide.

5. The process of hydrolyzing and mordanting an article of plastic cellulosic material which comprises treating it with a hydrolyzing bath containing a mordant selected from the group composed of tannic acid, potassium permanganate, antimony sulphide, aluminum hydroxide, copper ferrocyanide and nickel hydroxide.

6. The process of dyeing a photographic film support of a plastic cellulosic derivative which comprises treating it with a hydrolyzing bath containing in solution a mordant selected from the group consisting of tannic acid, potassium permanganate, antimony sulphide, aluminum hydroxide, copper ferrocyanide and nickel hydroxide, and then submitting said film support to the action of a dye which is fugitive in the customary photographic baths.

7. The process of hydrolyzing and mordanting an article of plastic cellulosic material which comprises treating it with a hydrolyzing bath containing potassium permanganate.

8. The process of hydrolyzing and mordanting an article of plastic cellulosic material which comprises treating it with a hydrolyzing bath containing aluminum hydroxide.

9. The process of hydrolyzing and mordanting an article of plastic cellulosic material which comprises treating it with a hydrolyzing bath containing antimony sulphide.

KENNETH C. D. HICKMAN.

BRIEF FOR APPELLANTS

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 13,517

GEORGE F. STRADAR AND FAIRCHILD CAMERA AND INSTRUMENT CORPORATION,
Appellants,

v.

ROBERT C. WATSON, Commissioner of Patents,
Appellee.

Appeal from the United States District Court for the District of Columbia

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United States Court of Appeals
For the
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Statement of Questions Presented

1. A first question is whether the Stradar invention, comprising a plastic engraving plate tinted in a critical manner with a critical dye composition, meets the statutory criteria for a patentable invention where the record affirmatively shows that it has advanced the useful arts and was not obvious to one skilled in the art.

2. A second question is whether two prior patents to Hickman, describing an anti-halation photographic film, anticipate the Stradar invention where the record shows the Hickman film to be structurally quite different from the Stradar engraving plate and one that could not be used for such a purpose, and where the Hickman patents contain no disclosure of the problem solved by the Stradar invention nor suggest its solution.

3. A third question is whether the Stradar claims on appeal are patentable over the Hickman anti-halation photographic film, where such claims distinguish in terms from the Hickman disclosures in several important respects, including the introductory clause of each claim which limits the claim to an ''engraving plate for reproducing images by printing processes''.

4. A fourth question is whether the Trial Court erred (1) in failing to give proper weight to extensive evidence before it, and not before the Patent Office, on the practical problem with which the art was confronted, its solution by the Stradar invention, its commercial success, and the failure of the Hickman patents to realize the problem or teach its solution; and (2) in holding, in spite of such additional evidence, it was ''controlled by the presumption in favor of the determination by the Patent Office''.

Parties

GEORGE F. STRADAR AND FAIRCHILD CAMERA AND INSTRUMENT CORPORATION,

Appellants,

ROBERT C. WATSON, COMMISSIONER OF PATENTS,

Appellee.

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IN THE

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GEORGE F. STRADER, AND FAIRCHILD CAMERA AND INSTRUMENT CORPORATION,
Appellants,
v.
ROBERT C. WATSON,
COMMISSIONER OF PATENTS,
Appellee.

Appeal No. 13,517

BRIEF FOR APPELLANTS

I—Jurisdictional Statement

This Action was brought in the Court below, under the provisions of Title 35 U. S. Code, Section 145 (Act of July 19, 1952, c. 950, Sec. 1; 66 Stat. 803), to authorize the Commissioner of Patents to issue a patent to George F. Stradar on an application filed December 29, 1950, for "Image Engraving Plate and Process for Producing the Same". This appeal is taken under the provisions of Title 28 U. S. Code, Sections 1291, 1294 (Act of June 25, 1948, c. 646; 62 Stat. 929, 930), from the Judgment of the Court below dated June 27, 1956, dismissing the Complaint (App. 53)*.

II—Statement of the Case

(a) *The Invention in Issue:*

The Stradar invention here involved is a blank plastic engraving plate having one polished or finished surface impregnated in a critical manner with a critical dye composition to aid an engraver in cutting a half-tone engraving from the blank plate and to aid a printer in using the resulting engraving. The plates in issue are particularly suitable for use in the photo electric engraving machine put on the market some years ago and described in Boyajean Patent Re. 23,914 (Exh. 2**, App. 96), and shown in Exhibit 3 (App. 91), for producing plastic half-tone engraved plates as a substitute for the costly and time-consuming zinc or copper photo chemical half-tone plates.

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* For the sake of brevity, references to the joint Appendix filed herein are designated "App. ——".

Initially the plates furnished by the Fairchild Company for use on its engraving machine were of clear cellulose-nitrate plastic (Exh. 4 phys.) While the clear blank plates made satisfactory pictures, they gave rise to a number of customer complaints (App. 24-25; Exh. 9, App. 93). Some of these complaints were based on psychological difficulties of the operator and some were quite real. As for the psychological difficulties, the users of half-tone plates were accustomed to the blued zinc plates which gave directly an indication of the quality of the picture (App. 10) and, as a consequence, they lacked confidence in the clear plastic plates which did not give a clear indication of the character of the picture. At the same time, the customers were not able to make proofs from the clear plastic plates to determine picture quality both because many lacked proofing presses (App. 25) and because the use of proofing ink on the engraved plate sometimes caused "smudging" of pictures later printed from the plate (Exh. 9, App. 93).

Among the real shortcomings of the clear plastic plates, the following were the most important:

(1) *Errors in Printing.* Because the image on the engraved plate was not very distinct, the plates were some-

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** Since Appellee offered only a single exhibit, all references to exhibits are to those of Appellants unless otherwise specified.

times so inserted in the press as to result in errors in printing, for example, pictures printed upside down or blank pictures due to insertion of the plate in the press with the reverse side in printing position (App. 10, 21-22, 23, 26). The leading trade magazine "Editor and Publisher", in an article describing the first year of progress of the Fairchild engraver noted some of the problems encountered in the use of clear plastic plates:

> "Then some of the pictures began coming out upside down in the paper and it was found that after the stereos stuck the double-sided tape on the plastic it was hard for them to tell the top from the bottom." (Exh. 11, App. 95)

(2) *Defects in the Engraved Plate.* Occasionally in making engravings on a photoelectric engraving machine a defect occurs due to improper operation of the machine. These defects were not readily discernible in the clear plastic engravings and could readily escape notice until they actually appeared in the printed picture in a magazine or newspaper. Such a defect is present in Exhibit 6 (Phys.), as pointed out by Mr. Hancock (App. 18-19), although it is not readily noticeable.

(3) *Difficulty of Adjustment of Engraver.* In engraving a plate on a Fairchild photoelectric engraver, it is necessary to make adjustments of the machine in accordance with the average brightness and the contrast ratio of the picture being reproduced (setting the black level and white level of the machine). These adjustments are described in detail in Boyajean patent Re. 23,914 (Exh. 2, App. 102-104, column 6, 11.6-18; column 6,1.77—column 8, 1.10; and column 10, 11.20-54). Proper adjustment of the engraving machine to obtain a good quality picture was quite difficult when using clear plastic plates, because the minute indentations did not show up clearly through the microscopic viewer (App. 10, 20, 21, 22).

(4) *Operator Difficulties.* As a corollary of the difficulty of properly adjusting the engraving machine when using clear plastic plates, there occasionally resulted pictures of poor quality and the operator of the machine was required to remake the plate. This caused operator dissatisfaction and turn-over (App. 22).

With the foregoing shortcomings of the clear plastic plate in view, the Fairchild Company assigned to Mr. Stradar the problem of developing an engraving plate which eliminated them. The requirements established for such a plate seemed in part mutually inconsistent. The plate must have a contrasting tinting of the following characteristics (App. 10-11):

(a) Permanency—so that the tinting would not rub off in handling or in use in the engraving machine;

(b) Limited depth of penetration—less than the minimum depth of deformation of the engraved plate in the darkest portion of the picture, for example, a depth of the order of 1/10,000 inch;

(c) Freedom from injury to the printing surface of the plate—that is, the tinting composition must not physically or chemically react with, or soften, the polished printing surface; if it does, the reproduced picture is degraded;

(d) No effect on the rate of thermal decomposition of the plastic plate;

(e) Substantially no products of decomposition or precipitation residues remaining on the surface of the plate (App. 12).

Essentially these same citeria characterizing the Stradar invention are set forth in his application (App. 61-62).

Mr. Stradar, a chemist then having some twenty years' experience in the chemical and metallurgical fields, applied himself diligently to the problem:

> "A Well, when the problem was presented to me, I first obtained samples of the present engraving sheet we were using, decided on the attack to pursue, and adjusted various solvents, mixtures of dyes therein, made sample plates and scratched them or deformed them in some manner to show what depth I was penetrating, to the fugitive nature of the coating, and also made some photomicrographs of the cross-section of the plates to show what the effect, the depth of penetration there, was.
>
> "I did as much as I could possibly do to simulate the service handling, what the service people or operators in the field would do in handling the plates." (App. 12)

By November, 1949, Mr. Stradar had arrived at what he considered to be a satisfactory solution, namely, a plastic engraving plate in which a dye and solvent mixture critically related to the particular plastic of the engraving plate is applied to the plate, as described in the patent application in issue (Exh. 1, App. 60-62).

Mr. Stradar described what he considered his invention to be, divorced from the technicalities of claim language:

> "A I feel that I have an engraving plate which is used for reproducing images by printing process, such plate comprising a sheet of deformable and soluble plastic, such as cellulose nitrate, and the surfaces being finished, such as by polishing, and one surface of which is treated with a mixture of a dye and a solvent, which are both—a dye and solvent for the plastic and for the dye.
>
> "For example, if the sheet were cellulose nitrate, we would use the 95 per cent methyl alcohol, plus two-tenths per cent methyl violet in the alcohol solution.
>
> "Now, it is also important that the treated surface must retain the original physical characteristics of

> that finished surface, and it is also important that the surface be tinted to a depth which is less than the minimum penetration of the stylus. For example, about a ten-thousandth of an inch." (App. 12-13)

This tinted plastic plate, a sample of which is in evidence (Exh. 5 Phys.) overcame all of the shortcomings of the clear plastic plate described above. It eliminated errors in printing (App. 22-23); it showed up any defects in the plate while the engraving was being made (App. 18-19, Exh. 7 Phys.); it facilitated adjustment of the engraving machine to set the black level and the white level of the picture (App. 22-23); and it eliminated operator difficulties arising from numerous remakes of pictures of poor quality (App. 23).

The tinted plastic plate devised by Mr. Stradar was definitely an advancement of the useful arts.

(b) *Commercialization:*

The tinted engraving plate was first put on sale in 1950 and achieved immediate success. Customers were enthusiastic (Exh. 10, R94). Sales volume developed rapidly from a value of $414,000 in that year (Exh. 1, App. 81) to a value of $1,484,000 in 1955, the total sales to the end of 1955 aggregating $5,344,000 (App. 27). The commercial success of the tinted engraving plate was also attested by Mr. Shivers, Art Director of the Camden Courier-Post Newspapers, who has continuously used a Fairchild engraving machine since 1949, first with clear plastic plates and later with tinted plastic plates. He pointed out clearly and succinctly how the tinted plastic plates eliminated various troubles encountered in the commercial use of the clear plates (App. 21-23). It will be developed later that the question of patentability of the Stradar invention over the prior art is free from doubt, but if there were any doubt its marked commercial success would resolve such doubt in favor of patentability.

(c) *The Claims in Issue:*

While it is clear from the foregoing that Stradar has made an important contribution to the engraving art which represents invention, it is recognized that the real test of patentability is whether the claims of the application define that invention in a way to distinguish from the prior art. It is submitted that in this case they do.

There are in issue thirteen claims to the tinted engraving plate as an article of manufacture and one claim (14) to the process of manufacture of such a plate (Exh. 1, App. 63-65). One claim (15) to the process of forming a half-tone plate from the tinted blank was allowed by the Board of Appeals (Exh. 1, App. 65, 90). The thirteen article claims were rejected as a group by the Examiner and by the Board of Appeals (Exh. 1, App. 68, 71, 78, 90) so that only a representative claim need be considered in detail. The Board of Appeals considered claim 6 as "illustrative" (App. 84) of the article claims and that selection is accepted. That claim, broken down into its essential separate features, reads as follows:

> (1) An engraving plate for reproducing images by printing processes comprising:
>
> (2) a finished-surface sheet of cellulose nitrate,
>
> (3) only one face thereof having a surface portion treated with
>
> (4) a mixture of approximately 95% methyl alcohol and an aniline dye in a concentration of the order of 0.2%,
>
> (5) said treated surface material retaining substantially the original character of the finished surface (Exh. 1, App. 63).

This claims follows fairly closely Mr. Stradar's description in his own words of what he conceived to be his invention (App. 13) except for the qualification as to the depth of penetration of the dye mixture, but it is implicit from the Stradar specification that the penetration must be less than that of the deforming stylus during the cutting of the plate, else there would be no contrast between the cut and uncut portions of the plate and that is the entire object of the invention. This feature is specifically spelled out in claims 10, 11 and 14 (Exh. 1, App. 64-65).

The single process claim reads as follows:

> 14. The process of producing a finished-surface engraving plate for reproducing images by printing processes which comprises treating a surface portion of only one face of a deformable plastic material with a solution of a dye in a mutual solvent for the dye and the plastic material so as to impregnate the material with the dye to a depth less than the maximum deformation encountered in engraving while retaining substantially the original character of the finished surface.

(d) *The Prior Art:*

The claims on appeal stand disallowed as failing to "define invention in view of the prior art" (Finding 7, App. 52). The prior art relied upon by appellee consists of two patents to one Hickman, Nos. 1,900,877 and 1,957,888 (App. 108, 111). The disclosure of the first Hickman patent is described by Mr. Stradar at Appendix, pp. 28-29. In brief, this patent describes a negative-emulsion motion-picture film having an anti-halation layer with the property of absorbing light in certain portions of the visible spectrum to which the emulsion is abnormally sensitive. As shown in Fig. 2, the film 1 has a layer 2 (of undisclosed and uncritical depth) tinted with a blue dye in a solvent mixture comprising acetone and methyl alcohol. The opaque photographic emulsion layer 3 overlies the tinted layer 2. In Fig. 3, the emulsion layer and the tinted layer are on opposite sides of the film base. The only reference to the process of treating the film to form the tinted anti-halation layer 2 is the statement:

> "* * * This may be applied on either side of the support during manufacture, employing any of the well known means for the application of the dye. The solvent will penetrate the support sufficiently to embody permanently the dye in the surface thereof, so that it will not be removed in the ordinary photographic processes * * *." (App. 109, 11.93-100)

It may be assumed that the "well known means" may be that described in the earlier-filed Hickman patent 1,957,888.

The second Hickman patent No. 1,957,888 (App. 111) was explained by Mr. Stradar at Appendix 31-34. In brief, that patent describes a *process* for the anti-halation dyeing of photographic film comprising three steps:

> 1. Hydroylsis by immersing the film in an alkaline bath which chemically reacts with the surface of the film to produce a softened, roughened surface;
>
> 2. Mordanting by washing and soaking the hydrolized film in a bath of tannic acid, or the like, which precipitates a deposit of fine particles into the softened surface layer of the film; and
>
> 3. Dyeing the film, treated as described, by immersing in an aqueous dye solution which effectively dyes only the deposited mordant so that the dye can subsequently be washed out. This characteristic is recited among the advantages of the process (App. 112, 11.61-67).

While Appellee relies upon these two Hickman patents as prior art, as pointed out in detail hereinafter these two patents are found in a different art and are directed to a different problem. The actual prior art relevant to the

Stradar invention was the prior clear engraving plate (Exh. 4, Phys.) acknowledged in the Stradar application (App. 55-56). It is against such clear engraving plates that the Stradar invention must be measured and when so measured clearly meets the tests of patentability.

(e) *The Prior Proceedings:*

The proceedings leading up to this appeal are quite unusual. The Examiner, in an Office Action of September 8, 1952 (Exh. 1. App. 71), finally rejected all of the claims in the Stradar application (1-15, inclusive) on the disclosure of a patent to Ford for an ornamental plastic sign. During an interview with the Examiner *after the final rejection,* the Examiner called attention to two additional patents to Hickman (Exh. 1, pp. 24, 27; App. 78), which were offered by Appellee in its Exhibit 1 (App. 108, 111). An appeal was taken to the Board of Appeals but, in the Examiner's Statement of July 1, 1953 (Exh. 1, App. 82-83), the Examiner withdrew his rejection on the Ford patent, relying solely on the Hickman patents *cited after the final rejection.*

The Board of Appeals in their decision dated April 30, 1954 (Exh. 1, App. 84-90) affirmed the rejection of claims 1-14, inclusive, in spite of their finding:

> "* * * We are of the opinion that in view of the significant and unobvious results that the appellant obtains by substituting the tinted plate recited in this claim for the clear plate which has been previously used in this process, and the outstanding commercial success of the claimed process, this substitution renders the claimed process patentable." (App. 90)

The Court below in its Memorandum (App. 48-51) did not disagree with the quoted finding of the Board of Appeals but effectively found that the evidence offered at the trial confirmed that finding, saying:

> "The evidence was clear that the Stradar tinted plate was useful and became a commercial success. Witnesses who had used the Stradar plate told how the tinted plastic plates eliminated various troubles encountered in the commercial use of the former clear plates." (App. 49)

In fact, there is a suggestion that the Court below disagreed with the conclusion of the Board of Appeals in its statement that it could not

> "* * * set aside the decision of the Patent Office merely because its opinion differs from that of the Board of Appeals. * * *" (App. 50)

As developed more fully hereinafter, it is submitted that the Court below misapplied the law to the undisputed facts in that it (1) gave a near-conclusive effect to the conclusions of the Patent Office in spite of extensive new evidence offered at the trial showing such conclusions to be clearly erroneous; and (2) it followed the Board of Appeals' erroneous interpretation of the law on patentable inventions.

It is important to note that, insofar as the claims are concerned, this Court may *accept every finding of fact* of the trial Court, with the single exception of general conclusory Finding 7*, and still by a correct application of the law find Appellants entitled to a patent including these claims. In other words, Appellants basically do not challenge the factual findings either of the Board of Appeals or the Court below—what Appellants challenge is the misapplication of accepted legal principles to those findings.

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* Finding 7 is really a Conclusion of Law, reading: "Claims 1 to 14 do not define invention in view of the prior art" (App. 52). Findings 4, 5, and 6 are, in part, erroneous and contrary to the record as pointed out below (pp. 34-38), but even accepting such errors, under accepted legal principles they do not preclude the grant of a patent to Appellants including claims 1-14, inclusive.

III—Statutes Involved

The determination of the issues on appeal requires the consideration of those Statutes defining the nature of patentable inventions and the conditions precedent to the grant of a patent and the Statute providing the instant remedy to an applicant dissatisfied with the holding of the Patent Office. The pertinent sections of the Patent Statutes (Title 35 U. S. Code) read as follows:

> Section 101. Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
>
> Section 102(a). A person shall be entitled to a patent unless the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent in the United States, or
>
> Section 102(b). The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.
>
> Section 103. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

(Act of July 19, 1952, c. 950, Section 1; 66 Stat. 797, 798).

Section 145. An applicant dissatisfied with the decision of the Board of Appeals may, unless appeal has been taken to the United States Court of Customs and Patent Appeals, have remedy by civil action against the Commissioner in the United States District Court for the District of Columbia if commenced within such time after such decision, not less than sixty days, as the Commissioner appoints. The court may adjudge that such applicant is entitled to receive a patent for his invention, as specified in any of his claims involved in the decision of the Board of Appeals, as the facts in the case may appear and such adjudication shall authorize the Commissioner to issue such patent on compliance with the requirements of law. All the expenses of the proceedings shall be paid by the applicant.

(Act of July 19, 1952, c. 950, Section 1; 66 Stat. 803).

IV—Statement of Points

Appellants rely upon the following points of error in the Memorandum of the Court below (App. 48-51) and in its Findings of Fact and Conclusions of Law (App. 51-52):

1. The Court below erred in holding that:

> "The issues raised in this case are within the special competence of the officers of the Patent Office, * * *" (App. 50)

2. The Court below erred in holding that:

> "* * * the case is therefore controlled by the presumption in favor of the determination by the Patent Office." (App. 50)

3. The Court below erred in holding that, under the rule of *Smith* v. *Kingsland,* 85 App. D. C. 284; 178 F. (2d) 26; 82 USPQ 353; it could not:

> "* * * set aside the decision of the Patent Office merely because its opinion differs from that of the Board of Appeals. * * *" (App. 50)

4. The Court below erred in holding that:

> "* * * the evidence reveals a reasonable basis for the determination of the Patent Office, * * *" (App. 51)

5. The Court below erred in finding that, aside from the introductory clause, each of claims 1-4, inclusive, 8, 9, 12, and 13 describes "the tinted product disclosed by the Hickman patents" (Finding 4, App. 52).

6. The Court below erred in failing to give patentable significance to the limiting introductory clause of each of the claims on appeal.

7. The Court below erred in finding:

> "The evidence failed to establish any difference critical to an improved result in the use of a solvent consisting of 95% methyl alcohol instead of the solvent disclosed in the Hickman patent No. 1,900,877, * * *" (Finding 5, App. 52)

8. The Court below erred in finding:

> "Claims 10, 11 and 14 are indefinite in their reference to the depth of penetration of the dye in the base material * * *." (Finding 6, App. 52)

9. The Court below erred in finding as a fact that:

> "Claims 1 to 14 do not define invention in view of the prior art." (Finding 7, App. 52)

10. The Court below erred in concluding as a matter of law that Appellants are not entitled to a patent containing claims 1-14, inclusive, on appeal (Conclusion 1, App. 52).

11. The Court below erred in failing to find that the Stradar tinted blank engraving plate has advanced the useful arts, that it was not obvious to one skilled in the art, and that it therefore meets the statutory criteria for a patentable invention.

12. The Court below erred in failing to find that the Hickman patents contain no disclosure of the problem solved by Stradar and fail to suggest its solution and, hence, that they do not anticipate that invention.

V—Summary of Argument

A. The Stradar tinted blank engraving plate represents a worthy invention which has advanced the useful arts and one which was not obvious to one skilled in the art. The Stradar invention meets the statutory criteria for a patentable invention.

B. The prior Hickman patents relied on by Appellee, describing anti-halation photographic films, are "paper" patents which achieved no commercial use; they describe a physical structure quite different from Stradar's engraving plate and one which could not be used as an engraving plate; and finally the Hickman patents contain no disclosure of the problem to which the Stradar invention is directed and fail to teach or suggest its solution. The authorities uniformly hold that such references are not anticipations.

C. Each of the claims on appeal distinguishes in terms from the disclosure of the Hickman patents in several respects, including the express limitation in the introductory clause of each claim. That limitation "gives life, meaning and vitality'' to the remainder of the claim and, under the applicable authorities, alone serves to impart patentability to the claim.

D. At the trial in the Court below, Appellants introduced extensive evidence in addition to that before the Patent Office. That evidence gave the complete story of the practical problem with which the art was confronted, its solution by the Stradar invention, its commercial success, and the failure of the Hickman patents to realize the problem or teach its solution. The Trial Court, erroneously construing the controlling authorities, failed to give proper weight to such additional evidence, actually deciding the case as though it were an appeal on the Patent Office Record only.

VI—Argument

A. The Stradar Invention Has Advanced the Useful Arts and Meets the Statutory Criteria of a Patentable Invention (Point 11)

As stated above, the actual prior art relevant to the Stradar invention was the prior clear engraving plate (Exh. 4, Phys.). The correction of the defects of the prior clear plates by the Stradar engraving plate with a tinted surface layer have been related above (pp. 1-6) and need not be repeated here. There can be no question but that the Stradar invention advanced the useful arts, the test set by the Constitution for determining a patentable invention (Article 1, Section 8).*

Perhaps one of the best elaborations of this test of patentable invention is found in the oft-quoted decision in the case of *O'Rourke Engineering* v. *McMullen* (C. A. 2,

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* The Congress shall have power * * * To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries.

1908) 160 Fed. 933 (Cert. den. 210 U. S. 435)* in which, in sustaining the patent in suit, the Court said:

> "The principal question in such cases is: Has the patentee added anything of value to the sum of human knowledge, has he made the world's work easier, cheaper and safer, would the return to the prior art be a retrogression? When the court has answered this question, or these questions, in the affirmative, the effort should be to give the inventor the just reward of the contribution he has made. The effort should increase in proportion as the contribution is valuable. Where the court has to deal with a device which has achieved undisputed success and accomplishes a result never attained before, which is new, useful and in large demand, it is generally safe to conclude that the man who made it is an inventor. * * *"

The tinted engraving plate invented by Stradar "has achieved undisputed success and accomplishes a result never attained before," one of the tests of the preceding quotation. It is "safe to conclude" that Stradar is an inventor.

This Court stated such test of patentability quite similarly in the recent case of *L-O-F Glass Fibers* v. *Watson* (1955), App. D. C. ; 228 F. (2d) 40; 107 USPQ 197:

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* Quoted in whole or in part with approval in:

Boyce et al v. *Pyrene* (D. N. J. 1923) 290 Fed. 998, 1004; *Alliance Securities* v. *Mohr* (N. D. Cal. 1925) 14 F. (2d) 793, 796; *Nash Engineering* v. *Trane* (D. Mass. 1927) 20 F. (2d) 439, 442; *Butler* v. *Burch Plow* (C. A. 9 1927) 23 F. (2d) 15, 24; *General Electric* v. *DeForest* (C. A. 3, 1930) 44 F. (2d) 931, 936; *In re Symonds* (C. C. P. A. 1931) 47 F. (2d) 972, 974; *In re Gibbons* (C. C. P. A. 1954) 210 F. (2d) 293; *Becton—Dickinson* v. *Robert P. Scherer* (E. D. Mich. 1952) 106 F. Supp. 665; *Cold Metal Process* v. *Newport Steel* (E. D. Ky. 1954) 119 F. Supp. 880; *Torok* v. *Watson* (D. C. D. C. 1954) 122 F. Supp. 788.

> "We are bound at first to look into the prior art to ascertain what may be the real merit of the invention and to decide whether or not it has substantially advanced the art. 'If it has done so, then the court is liberal in its construction of the patent to secure to the inventor the reward he deserves.' (Eibel Co. v. Paper Co., 261 U. S. 45, 63 (1923); Smith v. Snow, 294 U. S. 1, 14 (1935). As did Eibel, Cook made a 'very useful discovery which has substantially advanced the art.' * * *."

Moreover the Stradar invention meets the express criteria of Section 103 of the Patent Act (*supra,* p. 12) in that "as a whole" it would not "have been obvious at the time the invention was made to a person having ordinary skill in the art." The Board of Appeals in allowing process claim 15 said:

> "* * * We are of the opinion that in view of the significant and unobvious results that the appellant obtains by substituting the tinted plate recited in this claim for the clear plate which has been previously used in this process, and the outstanding commercial success of the claimed process, this substitution renders the claimed process patentable." (App. 90)

It is clear that if it was unobvious to substitute a tinted plate for a clear plate in an otherwise old engraving process, it was also unobvious to create that novel engraving plate, which had no other use. It is simply unrealistic to hold unpatentable claims to the engraving plate as an article of manufacture, the very heart of Stradar's process which the Board found to produce such "significant and unobvious results."

Furthermore, as brought out hereinafter (pp. 20-28), the prior art patents to Hickman are found in an entirely different art and are directed to an entirely different problem. The differences between the Stradar finished-surface engraving plate tinted in a critical manner with a critical dye composition and the anti-halation photographic film described in the Hickman patents are so great and so many that it cannot be said that such a departure from the prior art would have been obvious to one skilled in the engraving art.

From the seeming contradictions found in the holdings of the Examiner, the Board of Appeals, and the Trial Court outlined above (pp. 10-12), it appears that each of these tribunals was disturbed by the simplicity of the Stradar invention when viewed from the hindsight of his disclosure and by doubt that anything so simple could be patentable. But this hindsight evaluation of invention has uniformly been rejected by the authorities. A classic case in point is *Diamond Rubber* v. *Consolidated* (1911) 220 U. S. 428, which involved the famous Grant patent for a solid rubber tire for vehicles. In affirming the judgment of the lower courts sustaining the validity of the patent which covered a relatively simple modification of the disclosures of two prior patents showing rubber tires superficially resembling the patented tire but failing to solve the problem of lateral thrusts, the Court said:

> "* * * Knowledge after the event is always easy, and problems once solved present no difficulties, indeed, may be represented as never having had any, and expert witnesses may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention. But the law has other tests of the invention than subtle conjectures of what might have been seen and yet was not. It regards a change as evidence of novelty, the acceptance and utility of change as a further evidence, even as demonstration. * * *" (p. 435)

This Court has followed the same rule in *L-O-F Glass Fibers* v. *Watson, supra.* In that case, in reversing the district court and the Commissioner and authorizing the Commissioner to issue a patent on a claim for a glass heating apparatus, this Court said:

> "* * * invention is not to be denied simply because, when 'Viewed after the event, the means * * * (may) seem simple and such as should have been obvious to those who worked in the field * * *.' (Goodyear Co. v. Ray-O-Vac Co., 321 U. S. 275, 279, 60 USPQ 386, 388 (1944).) * * *"

It is clear that the Stradar invention meets the statutory criteria of patentability.

B. The Prior Art Hickman Patents Do Not Anticipate Because They Contain No Disclosure of the Problem Solved by Stradar and Fail to Suggest its Solution (Point 12)

It appears that the Hickman patents are "paper" patents which made no commercial imprint even in their own art, for Stradar testified that he had been unable to get a sample of the film of the type described in the patents (App. 34). However, a sample of a commercial form of anti-halation photographic film is found in Exhibit 13 (physical) described at App. 34. A comparison of this film with the engraving plate of the invention (Exh. 5, physical) clearly shows the great disparity between the flimsy photographic film with an opaque photosensitive emulsion coating and the transparent semi-rigid tinted engraving plate. Because of this opacity and flimsiness, *inter alia,* such a film is incapable of use as an engraving plate.

But what is more important, the Hickman patents are directed to a problem totally different from that of Appellant Stradar and do not actually represent the relevant prior art. Mr. Stradar testified (App. 31), and his testimony on this point was not qualified by a thorough cross-examination, that he found no disclosure in the Hickman patents which, had he had it before him when he was presented with the problem by the Fairchild Company, would have led to the invention here involved. In fact, Hickman and Stradar were dealing with totally different problems—Hickman with the elimination of "halation" in photographic films, a problem concerned with the light transmission properties of the film during exposure and development; Stradar with the physical character of an engraving plate, that is, the visual contrast between the engraved and unengraved portions of its printing surface (App. 30-31). In fact, if it were possible to engrave the tinted layer of the Hickman film, it still would not provide the desired contrast between the engraved and unengraved portions because of its opaque emulsion coating.

Hickman and Stradar were working in non-analogous arts, as admitted by the Board of Appeals (App. 90). These Hickman patents, though published nearly twenty years prior to Stradar's invention, have taught the engraving art nothing with respect to the solution of the problem solved by Stradar's invention, namely, an engraving plate which enables the quality of an engraving to be readily determined by inspection, both while engraving and after completion and removal from the engraving machine.

As a matter of law, such disclosures in a non-analogous art, teaching nothing to the art to which the invention relates and failing to disclose the problem solved by applicant or its solution, fail to anticipate an invention embodying a solution of that problem. This Court has followed that rule in *Marzall* v. *Switzer* (1952)—App. D. C.—; 105 F. Supp. 841; 94 USPQ 1. In that case, in allowing claims to a process of dyeing textiles and to the resulting article, this Court said:

> "* * * We can find nothing in the prior art which would lead one to suspect or to achieve the results of the present invention.
>
> "It is unnecessary that we go further into detail. * * *"

The Courts of Appeals of other circuits have followed a similar rule. Thus, in *Williams Iron Works Co. v. Hughes Tool Co.* (C. A. 10, 1940, 109 F. (2d) 500; 44 USPQ 322, two of the patents in issue were directed to rotary rock drills for oil well drilling and particularly to the heavy duty bearings of the rotary cutters to take care of vertical and lateral thrusts. In sustaining the validity of the patents over prior art which did not deal with this problem, the Court said:

> "A prior patent which fails to solve the problem toward which the inventor's efforts are directed does not anticipate a subsequent patent which successfully solves the problem and effectually accomplishes the desired result."

Himes v. *Chadwick* (C. A. 9, 1952), 199 F. (2d) 100; 95 USPQ 59 involved two patents directed to collapsible cardboard cartons. Defendant contended that one of the patents, to one Parks, was anticipated by a patent to Berkowitz. While holding the Parks patent invalid on other grounds, the Court held that it was not anticipated by Berkowitz, saying:

> "When the Parks claims are read in connection with the Parks specifications and drawings, the demonstration of 'reading on' the Berkowitz drawings is not convincing. We must inquire whether the patent relied upon as an anticipation would teach the mechanic skilled in the art the solution to the problem claimed to be solved by the invention now in issue. Cold Metal Process Co. v. Carnegie Ill. Steel Corp., (3 Cir.), 108

F. 2d 322, 333 (42 USPQ 44, 55-56), c.d. 309 U. S. 665 (44 USPQ 718).''

In *Lincoln Stores* v. *Nashua Mfg.* (C. A. 1, 1946), 157 F. (2d) 154; 70 USPQ 254, the patent in suit claimed a blanket having a homogenous nap of staple rayon fiber. The cited reference patents disclosed various types of rayon blankets with different weaves and different naps. In sustaining the claims in suit, the Court stated the rule:

> ''* * * a prior patent does not anticipate a subsequent patent where the prior patent failed to solve the problem which the subsequent patent solves successfully. Williams Iron Works Co. v. Hughes Tool Co., 109 F. 2d 500, 506, 510 (44 USPQ 322, 327, 332).''

Cold Metal Process Co. v. *Carnegie-Illinois Steel Corp.*, (C. A. 3, 1939) 108 F. (2d) 322; 42 USPQ 44 (c.d. 309 U. S. 665), involved two patents on a cold rolling steel strip mill which were sustained over cited patents showing similar constructions in other types of mills, the principal reference being a patent to Kriwan. In sustaining the patents in suit, the Court said:

> ''A study shows that Kriwan's patent was not addressed to cold steel rolling and makes no reference whatsoever to that problem. * * *
>
> '' 'A patent relied upon as an anticipation must itself speak. Its specification must give in substance the same knowledge and the same directions as the specification of the patent in suit. Otto v. Linford, 46 L. T. (N.S.) 35, 44. It is not enough to provide that a method or apparatus described in an earlier specification can be made to produce this or that result. Flour Oxidizing Co. v. Carr & Co., 35 R. P. C. 457. A singularly sensible test of the rule of anticipation is given in British Thomson-Houston Co. v. Metropolitan Vickers Electrical Co., 45 R. P. C. 22, by asking the question—

> "Would a man who was grappling with the problem solved by the patent attacked, and having no knowledge of that patent, if he had had the alleged anticipation in his hand, have said: That give me what I wish?" * * * '."

The Court of Customs and Patent Appeals has restated this rule again and again and has consistently applied it. Thus, in the most recent decision of that Court in the case of *In re Gruskin* (1956), —— F. (2d) —— 110 USPQ 288, there were involved a number of claims to a dentrifice including an inorganic salt to neutralize acid conditions in the mouth and a chlorophyll compound, the effectiveness of which was limited to a neutral or alkaline condition. In allowing all of the claims on appeal, the Court stated the rule:

> "We have held in the past that the discovery of a problem calling for an improvement is often a very essential element in an invention correcting such a problem.
>
> * * *
>
> We are of the opinion that appellant has recognized, attacked, and successfully solved a problem, achieving unobvious and unexpected results which were not suggested or disclosed to one skilled in the art by the cited references, either singly or in combination." (pp. 292 and 293)

Again, in the recent decision of that Court in the case of *In re Shaffer* (1956), 229 F. 2d 476, 108 USPQ 326, there were involved five claims to a chemical titrating apparatus which had been rejected on the prior art. In reversing the Commissioner and allowing the claims, the Court said:

> "* * * In short, there is no teaching in either of the patents which would suggest that they could be

> combined for the purpose of producing a more accurate titration. In fact, a person having the references before him who was not cognizant of appellant's disclosure would not be informed that the problem solved by appellant ever existed. Therefore, can it be said that these references which never recognized appellant's problem would have suggested its solution? We think not, and therefore feel that the references were improperly combined since there is no suggestion in either of the references that they can be combined to produce appellant's result. * * * Furthermore, as a general matter, in determining patentability, the conception of a new and useful improvement must be considered along with the actual means of achieving the improvement. In re DeLancey, 34 C.C.P.A. (Patents) 849, 159 F. 2d. 737, 72 USPQ 477. In re Bisley, 39 C.C.P.A. (Patents) 982, 197 F. 2d 355, 94 USPQ 80. *And it should be remembered that in many cases the discovery of a problem is often an essential element in an invention correcting such a problem;* and though the problem, once realized, may be solved by the use of old and known elements, this does not necessarily negative invention. In re Hamilton, 20 C.C.P.A. (Patents) 987, 64 F. 2d 141, 17 USPQ 245. In re Bisley, supra." (p. 329; emphasis added)

Again, in the recent case of *In re Krodel et al* (C.C.P.A. 1955) 223 F. 2d 497; 106 USPQ 195, there were involved two claims for a process of de-inking waste paper which had been rejected by the Examiner on prior art and, also, as objectionably functional. In reversing the Examiner and holding the claims patentable over the prior art, the Court said:

> " * * * We have often held that in determining patentability the conception of a new and useful im-

> provement must be considered along with the actual means of achieving the improvement. In re Bisley, 39 C.C.P.A. (Patents) 982, 197 F. 2d 355, 94 USPQ 80; In re DeLancey, 34 C.C.P.A. (Patents) 849, 159 F. 2d 737, 72 USPQ 477. Thus the mere fact that others have used the same chemical is not necessarily conclusive of lack of invention. * * * It appears that the secret discovered by appellants is to obtain an optimum concentration of the chemical which in turn gives the desired zeta potentials. This, we feel, is a sufficiently unobvious result of applicants' process to warrant patent protection. We are especially of this opinion since *the prior art does not appear to have recognized the problem solved by appellants and therefore cannot be said to have taught its solution. The discovery of a problem calling for an improvement is often a very essential element in an invention correcting such a problem.* In re Bisley, supra; In re Hamilton, 20 C.C.P.A. (Patents) 987, 64 F. 2d 141, 17 U.S.P.Q 245. * * * " (p. 199; emphasis added)

To the same effect is *In re Merkle* (C. C. P. A., 1945) 150 F. (2d) 445; 66 USPQ 165, where there were involved claims to a sealed paper milk container in which the problem of leaking during shipment was overcome by providing close and strong adherence of the ends of the container to the body and, at the same time, providing for reasonable expansion with temperature changes. In reversing the Patent Office and allowing the claims, the Court stated the question:

> "The question 'to be determined is whether it was invention to make the substitution with such physical changes as would be a normal way of making the substitute'. This, of course, is the proper way to approach the question. Does the prior art suggest doing what appellant has done? Does it suggest modification? Is

> there anything in the prior art that would suggest to anyone skilled in the container art how he could modify the references and consolidate them and produce his article so as to solve the problem upon which he was working?"

The same rule was well stated by the Court in the case of *In re Bisley* (1952) 197 F. (2d) 355; 94 USPQ 80. In that case there were involved claims to a food mixer including provisions for supporting the mixing bowl either directly from the base or upon a removable turntable without impairing the efficiency of the mixing beaters. In reversing the Examiner and allowing the claims, the Court said:

> "Counsel for appellant in his brief contends that in a case like this invention is to be gauged not alone by the extent or simplicity of the physical changes made, but also by the perception of the necessity or desirability of making such changes to produce a new result. We think that this contention has merit. When viewed after disclosure by appellant these changes seem simple and such as should have been obvious to those in the field. However, this does not necessarily negative invention or patentability. Goodyear Tire & Rubber Co., Inc., et al. v. Ray-O-Vac Company, 321 U. S. 275 (60 USPQ 386); in re DeLancey, 34 C. C. P. A. (Patents) 849, 159 F. 2d 737, 72 USPQ 477. Moreover, the conception of a new and useful improvement must be considered along with the actual means of achieving it in determining the presence or absence of invention. In re DeLancey, supra. The discovery of a problem calling for an improvement is often a very essential element in an invention correcting such a problem; and though the problem, once realized, may be solved by use of old and known elements, this does not necessarily negative invention. In re Hamilton, 20 C. C. P. A. (Patents) 987, 64 F. 2d 141, 17 USPQ 245. * * *"

Thus, it is clearly established by an unbroken line of authorities that an invention representing the solution of a new problem is not anticipated by prior art references which neither recognize the existence of the problem nor contain any suggestion leading to its solution. Neither of the Hickman patents recognizes the problem of providing a finished-surface plastic plate suitable for engraving and printing; neither of these patents recognizes the problem of developing a sharp visual contrast between the engraved and unengraved portions of the plate; and neither of those patents contains any teaching or suggestion of the solution to either of those problems. Under the foregoing authorities, the Stradar tinted engraving plate represents a patentable invention.

C. Each of the Claims on Appeal Distinguishes in Terms From the Disclosures of the Hickman Patents (Points 5, 6, 7 and 8)

The uncontradicted and unqualified testimony offered at the trial establishes that the disclosure of each of the Hickman patents lacks a number of the essential features of the Stradar invention, as defined by the claims on appeal. Thus, considering claim 6, which the Board of Appeals considered typical, the following features are lacking from Hickman patent 1,900,877, the numbering corresponding to that of the elements of claim 6 above (p. 7):

(1) The Hickman device is not an engraving plate nor suitable for use as such a plate (App. 29, 45).

(2) The Hickman film does not have a "finished" or polished surface (App. 30, 41) and, therefore, would not be sufficiently plane to use for engraving.

(4) Hickman describes his solvent as a mixture of acetone and methyl alcohol, which Stradar stated would be harmful to his engraving plate (App.

43); Hickman does not disclose the use of a solvent consisting of methyl alcohol alone in a concentration of at least 95% (not more than 5% residual water) to avoid harmful softening of the plastic surface (App. 44-45, 47-48).

(5) The Hickman patent contains no disclosure as to the character of the resulting surface of the film after treatment (App. 30), as it was of no particular interest to him. Furthermore, there is no disclosure as to the depth of penetration of the tinting, as this was also of no importance to him (App. 30-31). In fact, Hickman states that the tinting dye may be embodied "in the substance of" the film itself as well as on either side (App. 109, 11.37-42), thus indicating that the depth of penetration was of no significance for his purposes. Furthermore, Hickman includes no description of how the tinted layer is formed, from which its character could be inferred (App. 29-30), contenting himself with the statement that this layer may be formed by "well known means" (App. 109, 11.93-98).

With respect to these deficiencies of Hickman patent 1,900,877, Mr. Stradar testified:

> "* * * I am afraid Mr. Hickman does not tell too much about how deep it will penetrate. He does say that it could be applied by any of the well-known methods of application for the dye, that is true. I have to agree with that, but I don't think that from this I could make an engraving sheet or engraving plate suitable for the process which we describe, where the depth of penetration is critical.
>
> "Q. So, it is the depth of penetration that is the part that is lacking in Hickman?
>
> "A. That is one thing that is missing.

"Q. What else is missing?

"A. He does not tell me what might happen to the top surface of the tinted sheet, whether or not we would have a softening effect, what effect it would have on the burning rate, what physical change or chemical change might occur in the surfaces of the nitrate. He doesn't mention that it is a nitrate film, or an acetate. I didn't see it here, sir." (App. 39)

Likewise, the second Hickman patent, No. 1,957,888, lacks the following essential features of the Stradar invention, the numbering corresponding to the numbering of the features of claim 6 above (p. 7):

(1) The Hickman device is not an engraving plate and is not suitable for use as one (App. 29, 45).

(2) The Hickman film does not have a "finished" or polished surface; in fact, the surface is deliberately roughened and softened by hydrolysis, rendering it unsuitable for use as an engraving plate (App. 32-33, 41).

(3) The Hickman film is not treated on one side only, but is immersed or dipped in the various treating solutions.

(4) Hickman does not use a mixture of approximately 95% methyl alcohol and a dye, but uses an aqueous dye solution, that is, one which is preponderately water. This aqueous dye solution causes the tinting to be fugitive, which renders it unsuitable for use in an engraving plate (App. 32-33). Furthermore, this aqueous solution causes the surface to soften and "swell" (App. 112, 1.16) emphasizing its unsuitability for use as an engraving plate.

(5) The treated surface of the Hickman film does not retain substantially its original character, but is

> deliberately roughened and chemically changed by the process steps described, rendering it unsuitable for use as an engraving plate (App. 32-33).

In addition, as in the first Hickman patent, the depth of penetration of the dye solution is not disclosed (App. 33) and is immaterial to the Hickman film.

In brief, *each* of the three steps of the Hickman process —hydrolysis, mordanting, and precipitation of dye, if applied to a plastic plate would render it unfit for use as an engraving plate (App. 32-33). In addition, the mordanting of the surface would clog the engraving machine and would also clog the half-tone engraving pattern (App. 33).

The Board of Appeals in its rejection of the claims in issue on this second Hickman patent did not rely upon what Hickman described as his invention, but upon a sketchy statement in the patent of what Hickman considered to be the prior art and reading as follows:

> "It has been common practice to dye film by applying solutions of dyes in organic liquids which carry the dyes into the body of the film, the liquid usually being a partial solvent for the film base as well as for the dye. These dyes are usually applied after the process of film forming by a series of rolls which transfer the dye to one side of the film. This dyeing may be accomplished, of course, by immersing the film or running it through a dye bath, but usually it is desired to dye but one side of the film." (App. 111, 11.4-14)

Mr. Stradar pointed out that this description of the prior art is much too vague and indefinite in terms to constitute a disclosure of his invention. Specifically, that general statement does not disclose the particular and critical concentration of the dye composition; it does not disclose the depth of penetration of the tinting material or suggest that it is important; and it does not disclose the character of the surface of the film before or after treatment, but if that surface is anything like that specifically described in the patent its chemically altered and softened surface would make it unsuitable for engraving (App. 33-34). This sketchy reference in the second Hickman patent fails as anticipation for the reasons pointed out in *Nye* v. *Coe* (D.C., 1942), 44 F. Supp. 582; 53 USPQ 663. In that case there was involved an application for an oil circuit breaker and an essential feature of the claims in issue was an explosion chamber for venting gases formed by an arc. The principal reference was a British patent, the drawings of which did not disclose this essential feature but the specification of which included the following statement:

> " 'In a modification of the preferred embodiment of the invention, an aperture in the enclosing box is provided adjacent each of the pairs of cooperating contacts so that the pressure developed within the box may be effective to scavenge the products of combustion formed at both points of interruption.' "

The Court held that the suggestion in the quoted statement was not sufficiently complete and definite to enable one skilled in the art to go directly from it to applicant's invention, saying:

> "It is not difficult to understand how an examiner could read in the modification of the British patent the anticipation claimed for it, after actually having before him the plaintiff's invention. This, however, would mean the exercise of 'hindsight' as that rather expressive word was used by Mr. Justice Stephens in the case of Becket v. Coe, 69 App. D.C. 51, 98 F. 2d 332, 336 (38 USPQ 26, 30) * * *.
>
> * * *
>
> "This court is not unmindful of the rule that a patentee need not describe in minutest detail, make ex-

periments, and accompany his descriptions with sketches or drawings, in order that his disclose may be an anticipation, yet the rule is also clear that before a disclosure can be held to be an anticipation, its language or claims must be so certain and descriptive, that one skilled in the art or one who has been termed a journeyman or an artisan, can visualize therefrom, specifically, definitely and in detail, the type of device or construction that was in the mind of the patentee who described it. The test adopted by a British court, quoted in the Skelly Oil Co. v. Universal Oil Products Co., 31 F. 2d 427, 431 (1 USPQ 18, 22), is stated as follows:

> 'Would a man who was grappling with the problem solved by the patent attacked, and having no knowledge of that patent, if he had had the alleged anticipation in his hand, have said: ''That gives me what I wish''?'

"Could a mechanic 'skilled in the art', by reading a modification of the British patent, certainly, directly, and without the need of any experimentation, have reached the invention of the plaintiff's claims? If in order to perfect the plaintiff's device, upon reading the modification lines 86 to 93, it necessitated extensive experimentation as well as the genius of an inventor, the plaintiff's invention is patentable."

The decision also contains excerpts from a number of earlier decisions following the same rule, namely, that the disclosure of a patent or publication to be an anticipation "must be so clear and definite as to enable any mechanic skilled in the art to reach the patented invention certainly, directly, and without the necessity of any experiment" (*Selectasine Patents* v. *Prest-O-Graph,* (D. Ore., 1920), 267 Fed. 840, 842 (aff. 276 Fed. 260; 282 Fed. 223). The sketchy reference in the second Hickman patent clearly would not so lead one skilled in the art to Stradar's invention of a sharp-contrast engraving plate.

Thus, the Trial Court erred when it found that, aside from the introductory clause, each of claims 1 to 4, 8, 9, 12, and 13 describes a "tinted product disclosed by the Hickman patents" (Finding 4, App. 52).

But, in addition to the specific differences from the disclosures of the Hickman patents just pointed out, each of the claims is limited by its introductory clause to "an engraving plate for reproducing images by printing processes". This introductory clause defines the use and environment of the structure positively claimed and gives rise to the novel and unexpected results of that structure —an engraving plate providing sharp visual contrast between the engraved and unengraved portions. This distinction alone patentably distinguishes the claims on appeal from the disclosures of the Hickman patents, and the Trial Court erred in failing to give patentable significance to this distinction.

While perhaps unnecessary to the decision of the issues on appeal, since all of the claims basically distinguish from the Hickman patents in the manner pointed out above, two groups of claims (claims 5, 6, 7 and claims 10, 11) contain additional limitations patentably distinguishing from Hickman and the findings of the Trial Court with respect to these two groups of claims are clearly erroneous and contrary to the record. Thus, each of claims 5, 6, and 7 is limited to an engraving plate treated by a solution of dye in "approximately 95% methyl alcohol" (App. 63-64) meaning that the solution contains not in excess of 5% water (App. 47). The Trial Court held that this concentration of alcohol was "not critical to an improved result" and concluded that these claims define nothing inventive over the Hickman patents (Finding 5, App. 52). The quoted premise is clearly erroneous and contrary to the record—hence, the conclusion fails. The first Hickman patent, 1,900,877, describes a solvent comprising equal parts of acetone and methyl alcohol (App. 109, 11.83-86) as to which Stradar testified:

> "Q. In other words, it is your view that the specific solvent disclosed by Hickman would not be satisfactory for your purpose?
> "A. It would be harmful; yes, sir." (App. 43)

Secondly, the undisputed evidence is that the concentration of methyl alcohol* *is critical* to the formation of a satisfactory engraving plate:

> "Q. Is there any relationship or optimum relationship as to the concentration of the solvent? I believe you mention a 95 per cent methyl alcohol. What happens if you use a more dilute solution of alcohol?
> "A. If we use a more dilute solution of alcohol, it has been found that the evaporation rate is considerably slowed and, as a consequence, we get a softening of the top surface of the plate.
> "We also arrive at a condition known as blushing, whereby the precipitation of such moisture, physically and chemically, changes the top surface to give us a frosted appearance, which again is undesirable in this type of product. (App. 12-13)
>
> * * *
>
> "Q. And is the water content important in its use for tinting an engraving plate?
> "A. It would be important to me, yes." (App. 44)
>
> * * *

---

* Neither acetone nor methyl alcohol is ordinarily commercially available or ordinarily used in chemically pure form without any water (App. 44). The concentration of an alcohol is more commonly expressed in terms of "proof", thus 80 proof alcohol has a concentration of 40%; conversely, 95% alcohol is 190 proof.

> "Q. Counsel has questioned you as to the water content of commercially available methyl alcohol and acetone. Is that a critical matter on the operating of your process concerned?
>
> "A. To this process, yes." (App. 46)

This testimony is merely confirmatory of the disclosure of the Stradar application, calling for 95% methyl alcohol (App. 59) and emphasizing that the presence of excess moisture causes formation of " 'blushing', which appears to be a whitish precipitate formed by moisture absorbed by the temporarily softened plastic material. When such a phenonomen is observed the treating mixture should be discarded and a fresh quantity prepared" (App. 61).

Not only is this concentration of the methyl alcohol a critical one, but it is one not disclosed in the Hickman patents. The first, 1,900,877, includes no mention of the concentration of the methyl alcohol of his dye solution. The second, No. 1,957,888, on the other hand, expressly discloses the use of an aquaeous dye solution, that is, one preponderantly water, which causes the surface to soften and "swell" (App. 112, 116) rendering it wholly unsuitable for use as an engraving plate (App. 33).

Thus, the Trial Court clearly erred when it held that claims 5, 6 and 7 did not patentably distinguish from Hickman in specifying a dye solution having a critical concentration of 95%.

The Trial Court also found:

> "6. Claims 10, 11 and 14 are indefinite in their reference to the depth of penetration of the dye in the base material and therefore, define nothing inventive over the Hickman patents." (Finding 6, App. 52)

There can be no question that this factor of depth of penetration of the dye is highly critical because the tinted surface layer of the plate must be penetrated by the engraving tool during the engraving of even the dark portion of a picture, when the penetration is least, to expose the untinted portion of the plate and give a marked contrast between the engraved and unengraved portions of the plate. On this point, the specification states:

> "* * * The amount of mixture should be controlled so that it penetrates the surface of the sheet to a depth substantially less than the maximum deformation of the sheet during the engraving process, for example, to a depth of the order of 0.0001 inch." (App. 60)

Stradar testified on direct examination:

> "Q. And what was the requirement with respect to the depth of impregnation of this tinting?
>
> "A. The stratum, or the top stratum and substratum, to an extent of 1/10,000 of an inch was imposed as being the maximum limit to which I could penetrate." (App. 11)

Furthermore, Stradar's testimony on cross-examination did not in any way qualify the quoted testimony, but wholly confirmed it:

> "Q. Now, what were the requirements (of your invention), again, just briefly?
>
> * * *
>
> "A. The most important being the depth or the control of the depth of penetration of the tinted surface, so that when the dot was removed by the heated stylus, a contrasting color would appear.
>
> "Q. That is an essential part of your invention; is that correct?
>
> "A. Yes. (App. 14)

* * *

> "Q. Now, you have testified at length as to the criticality of the depth of the coating on your product; is that right?
>
> "A. That is true". (App. 35)

Claim 11 of the group under consideration unquestionably is definite in its limitation of the depth of the dyed surface to a layer "of the order of 0.0001 inch". What could be more definite than that! Claims 10 and 14 define this feature as "a depth less than the maximum deformation encountered in engraving" (App. 64-65). Interpreted in the light of the above quoted statement in the specification, this expression is also definite from a practical standpoint. A factual situation closely analogous to the instant case was presented to this Court in *Montgomery* v. *Marzall* (1951), 88 App. D. C. 281; 189 F. 2d 640, 89 USPQ 12, involving an invention related to a process of making finished-surface paper by passing the unfinished paper, wet with a coating composition, over a heated polished drying drum, the dry paper then being peeled off the drum and led to a winding roll. The remaining essential facts were stated by this Court:

> "There was one weakness in the new process: when the coating composition had dried, the coated paper did not always immediately disengage itself from the casting surface. When it did not, particles of coating gradually began to stick to the drum surface, damaging the quality of the paper and roughening the surface of the drum so that it was necessary to shut down the machine and thoroughly clean the drum surface before operation could be resumed.
>
> "Montgomery found by experimentation that if the drum surface carried a film of oil so thin that it could not be detected even by rubbing the surface with a clean cloth, the dry coating would not stick to the drum but the wet coating would adhere long enough to give the proper finish to the coated paper. The

film of oil requisite for this result was obtained by adding to the coating composition itself a small quantity of oil. The quantity of oil required to be added to the coating composition in order to form an infinitesimal film on the drum is necessarily small, and the exact quantity is determined by the skilled operator who watches the point at which the paper leaves the drum surface, and increases or decreases the percentage of oil in order to maintain the 'cracking-off' point at the proper place, so that adherence to the drum will continue long enough but not too long."

The Patent Office had allowed a claim limited to the addition of oil in an amount in the order of one-tenth to one per cent. of the weight of the coating composition but both the Patent Office and the District Court had rejected claims which defined the amount of oil:

> "' * * * so adjusting the proportion of said film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.' "

This Court, in reversing and holding the claims sufficiently definite, referred to and quoted from two decisions of other Courts of Appeals saying:

> " * * * We find strikingly appropriate the following quotation from Proctor & Gamble v. Refining, ((C. A. 4, 1943) 135 F. 2d 900; 57 USPQ 505):
>
> 'There are many situations in the practice of the arts in which specific directions are properly omitted from the claims of patents because greater definition is either impracticable or is unnecessary to inform the art, and would serve only unduly to limit the scope of the invention or to invite evasion by

> those who desire wrongfully to misappropriate the substance of the invention.'

and this excerpt from Chadeloid Chemical Co. v. Wilson Remover Co., 224 F. 481, 484 (C. C. A. 2nd 1915):

> '* * * It was not necessary or wise to specify the exact proportion of wax, as this differs according to the work being done. Had the exact percentage been named, anyone could evade the patent by using more or less than the specified amount and thus could have secured all the advantages of the invention without the payment of a dollar.' "

Here, as in the *Chadeloid Chemical* case, it is "not necessary or wise to specify the exact" depth of penetration of the dye mixture as this will differ in accordance with the type of engraving being made and the depth of the engraving cut. If the depth of penetration, as defined in the claims, is unnecessarily restricted, anyone can evade the resulting patent by varying the depth of penetration more or less and still secure all the advantages of the invention.

D. The Trial Court Failed to Give Proper Weight to the Evidence Before It in Addition to that Before the Patent Office (Points 1-4, 9, 10)

At the trial in the Court below, Appellants introduced extensive evidence in addition to that before the Patent Office. Stradar the inventor, a skilled chemist of some twenty years' experience and now chief metallurgist of the Fairchild Company, testified as to the state of the art before his invention and the problem presented by that art, namely, the provision of an engraving plate which would give a sharp visual contrast between the engraved and unengraved portions; his efforts in solving that problem; the fundamental characteristics and essential features of his invention; and the nature of the disclosures of the Hickman patents in the practical state of the art and their failure to suggest the problem solved by his invention or to suggest its solution (App. 8-13, 28-34). Hancock, the Assistant Manager of the Engineering Department of the Fairchild Company, having some twenty-five years' experience in the engraving field, described the practical aspects of the Stradar invention and compared samples of engravings made from the Stradar plate with those made from prior art plates (App. 16-20). Shivers, Art Director of the Courier-Post Newspapers of Camden, New Jersey, who has had supervision of the making of engravings for those newspapers since 1949, testified as to the many practical advantages of the Stradar tinted engraving plate over the prior clear engraving plates (App. 21-23). Finally, Hyatt, General Manager of the Graphic Equipment Division of the Fairchild Company, gave the complete story of the commercial success of the Stradar engraving plate and the company's relations with its customers in this field and told of the growth of sales of these plates from $400,000 in 1950 to nearly $1,500,000 in 1955 (App. 23-27).

The Trial Court quite apparently gave little weight to all of the foregoing evidence not before the Patent Office, stating:

> "The issues raised in this case are within the special competence of the officers of the Patent Office, * * * the case is therefore controlled by the presumption in favor of the determination by the Patent Office." (App. 50)

even though such determination was made by the Patent Office without the benefit of the extensive additional evidence referred to above. This was an error of law. Clearly there is no presumption in favor of the correctness of an administrative determination made on the basis of only partial facts. The procedure before the Patent Office does not afford an opportunity to present evidence fully and completely, as was done in the Court below. This is undoubtedly the primary reason Congress gave an applicant his "day in court" as provided by Section 145 of the Patent Act (*supra,* p. 145). If the Court fails to accord proper weight to such additional evidence, the remedies provided by Section 145 are nullified.

Further, the technology of the Stradar invention as described in the specification and defined in the claims on appeal, as explained by Stradar at the trial (App. 12-13), and as represented in Exhibit 4 (Physical), is so simple that it is submitted that the Trial Court erred in holding that "issues raised in this case are within the special competence of the officers of the Patent Office" as found by the Trial Court (App. 50).

This Court has repeatedly reversed judgments of the Trial Court and the Patent Office in proceedings of this nature where such judgments, as here, have involved the misapplication of accepted legal principles to essentially undisputed facts. Thus, in the recent case of *L-O-F Glass Fibers* v. *Watson* (1955) — App. D. C. — 228 F. 2d 40, 107 USPQ 197; in reversing the District Court and authorizing the Commissioner to issue a patent on a claim for a glass heating apparatus over prior art on which the Patent Office and the District Court found the claim to be unpatentable, this Court said:

* * *

> "* * * The finding that Cook's claim 1 is unpatentable over the prior art of Barnard and Staelin stems from the application by the trial judge of a higher standard than the law demands with the result that his conclusion lacks substantial support in the evidence. It was not a case of what should have been—but was not—obvious to Dr. Plummer, and enough has been said to demonstrate that there was no 'obviousness' to the other experts.

> "We would not 'lightly' reverse the able trial judge (Larsen v. Marzall, 90 U. S. App. D. C. 260, 261, 195 F. 2d 200, 92 USPQ 306, 308 (D. C. Cir. 1952); Montgomery v. Marzall, 88 U. S. App. D. C. 281, 285, 189 F. 2d 640, 89 USPQ 12, 16 (D. C. Cir. 1951).) but we, too, have read the transcript and examined the exhibits. While there is evidence upon which, in part, the findings can be supported, on the entire evidence we are left with the definite and firm conviction that a mistake has been committed. (Dollar v. Land, 87 App. D. C. 214, 217, 218, 184 F. 2d 245 (D. C. Cir. 1950), cert. denied, 340 U. S. 884 (1950).) On the record made and with the exhibits before us, we are permitted a 'subjective opinion or formulation of a judgment,' which when so predicated, makes clear that the 'combination and improvement admittedly brought about are the product of creative talent' which lifts the Cook claim 1 to the level of patentability over and above the prior art cited. (Standard Oil Development Co. v. Marzall, 86 U. S. App. D. C. 210, 214, 181 F. 2d 280, 84 USPQ 363, 367 (D. C. Cir. 1950).) * * *"

* * *

Again, the case of *Larsen* v. *Marzall* (1952) 90 App. D. C. 260; 195 F. 2d 200; 92 USPQ 306, involved the sufficiency of Larsen's proof of reduction to practice of the invention in issue prior to the effective date of an earlier application of one Miller. This Court reviewed the testimony and held that the District Court erred in its legal conclusions drawn from such testimony and succinctly restated the law applicable to a proceeding of this nature:

> "Insofar as the District Court's findings are of fact, we agree with them and adopt them. Even if we disagreed, we would not overturn them lightly. Rule 52(a), Fed. R. Civ. P.; Wynne v. Boone, 88 U. S. App.

> D. C. 363, 191 F. 2d 220; Standard Oil Development Co. v. Marzall, 86 U. S. App. D. C. 210, 181 F. 2d 280 (84 USPQ 363). *But certain of the findings here are more in the nature of conclusions of law.* These include the trial court's determination as to the sufficiency of the laboratory tests to constitute reduction to practice and its conclusion concerning the adequacy of corroboration. Findings of Fact Nos. 13, 14, and 17. *On the legal aspects of these questions, we must form an independent judgment.*" (Emphasis added.)

Here, as in the *Larsen* case, the only finding of the Trial Court which need be rejected to reverse its judgment is Finding 7 (App. 52; *supra,* pp. 11-12) which is "more in the nature of (a) conclusion(s) of law", as in the *Larsen* case.

Again, in the case of *Montgomery* v. *Marzall* (1951) 88 App. D. C. 281; 189F. 2d 640, 89 USPQ 12, the Patent Office and the District Court had held unpatentable certain claims to a process of manufacturing paper, the District Court basing its holding on its—

> "* * * conclusion of law that the claims in issue are vague and indefinite at the precise point of novelty and fail to point out the invention with the required distinctness * * *."

In this Court:

> "The only defense presented by the answer of the Commissioner of Patents was that the claims in issue do not describe the process definitely enough to meet the requirements of R.S. §4888, 35 U. S. C. A. §33. * * *"

This Court considered at length the testimony in the case and, in the light of that testimony, held that, as a matter of law, the claims were sufficiently definite to comply with the Patent Statutes.*

In considering itself effectively bound by the decision of the Patent Office, the Trial Court referred to the decision of this Court in *Smith* v. *Kingsland* (1949) 85 App. D. C. 284; 178 F. 2d 26; 82 USPQ 353. That case involved claims to a tobacco drying house. The District Court held:

> "* * * 'The claims at bar are for the same invention as claim 2 of plaintiff's patent 2,051,348, and are unpatentable in the application at bar, because to allow said claims would result in double patenting.' * * *"

This Court affirmed that holding of the District Court. It is true the opinion of this Court does contain the general statement:

> "* * * Each such case must be decided upon its own facts; and the customary rule that the court, upon appeal, will not make an independent determination of its own as to whether or not the improvement is patentable, but will only reverse if there is clear error, seems applicable. While the interpretation of claims is said to be a question of law for the courts, the determi-

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* In addition to the *L-O-F Glass Fibers, Larsen, and Montgomery* cases, discussed above, the following decisions of this Court show that it has not hesitated in appropriate cases to reverse the Patent Office and the Trial Court and authorize the issuance of a patent:

> *Broderson* v. *Marzall* (1951), 90 App. D. C. 78; 194 F. (2d) 138; 91 USPQ 259; *Levin* v. *Coe* (1942), 76 App. D. C. 347; 132 F. (2d) 589; 55 USPQ 224; *Poulsen* v. *Coe* (1941), 73 App. D. C. 324; 119 F. (2d) 188; 48 USPQ 673; *Thornton* v. *Coe* (1938) 69 App. D. C. 383; 102 F. (2d) 347; 40 USPQ 85; *Carbide & Carbon Chemicals* v. *Coe* (1938), 69 App. D. C. 372; 102 F. (2d) 236; 40 USPQ 141; *Electrons, Inc.* v. *Coe* (1938), 69 App. D. C. 181; 99 F. (2d) 414; 38 USPQ 370; *Gasoline Products* v. *Coe* (1935), 66 App. D. C. 333; 87 F. (2d) 550; 31 USPQ 407; *Wach* v. *Coe* (1935), 64 App. D. C. 235; 77 F. (2d) 113; 25 USPQ 25.

> nation of both the Patent Office and the District Court that the claims, as interpreted, do not show an invention will not be overturned unless 'clearly wrong'. This question being of a technical nature which the Patent Office is well equipped to decide, its conclusion as to patentability should not be disturbed if there is a 'rational basis' for the decision. * * *" (Footnotes including citations omitted)

Nevertheless, it appears from the thorough analysis of the issues in the lengthy opinion of this Court that its affirmance was based primarily upon its independent agreement with the ruling of the District Court rather than upon its reliance on the principle that there was merely "a 'rational basis' for the decision". Furthermore, so far as appears from the opinion of this Court or that of the Court below (73 USPQ 430), *the case was considered only on the record before the Patent Office* so that the proceeding was more truly in the nature of an appeal from the Patent Office decision than a trial *de novo.* This factor undoubtedly influenced this Court's statement quoted above.

Hence, the decision in the *Smith* case is not controlling here. The decisions in the *L-O-F Glass Fibers, Larsen,* and *Montgomery* cases are more apposite to the facts of the instant case.

VII—Conclusion

In brief, the decision and the judgment of the Trial Court represent misapplication of accepted legal principles to the facts of this case in that they disregard the extensive evidence in the case that the Stradar invention represents a substantial advance in the useful arts; they disregard the fact shown by the record that the prior art represented by the Hickman patents failed to disclose the problem solved by the Stradar invention and failed to suggest its solution; they disregard the fact that the Stradar invention has achieved considerable commercial success; and they disregard the fact that the case below was a trial *de novo* so that the Trial Court was bound to give appropriate weight to additional evidence not before the Patent Office. On the whole record, the Trial Court should have authorized the Patent Office to issue a patent to Stradar including claims 1-14, inclusive, on appeal.

It is submitted that the judgment of the Trial Court should be reversed.

Respectfully,

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Dated: October 8, 1956.

BRIEF FOR APPELLEE

United States Court of Appeals
For the District of Columbia Circuit

APPEAL NO. 13,517

GEORGE F. STRADAR AND FAIRCHILD CAMERA
AND INSTRUMENT CORPORATION, *Appellants*,

v.

ROBERT C. WATSON, COMMISSIONER OF PATENTS,
Appellee.

**Appeal from the Judgment of the United States District Court
for the District of Columbia Circuit**

CLARENCE W. MOORE,
Solicitor,
United States Patent Office,
Attorney for Appellee.

S. W. COCHRAN
Of Counsel

United States Court of Appeals
For the
District of Columbia Circuit

FILED NOV - 1 1956

Joseph W. Stewart
CLERK

Appeal No. 13,517

STATEMENT OF QUESTIONS PRESENTED

The appellee disagrees with the Statement of Questions presented which appears in the Brief for Appellants. In the opinion of the appellee, the questions presented are:

1. Whether the terms of claims 1 to 4, 8, 9, 12 and 13 of application Serial No. 203,310 which, in accordance with law, should be considered in determining patentability, are anticipated by either Hickman patent No. 1,900,877 or Hickman patent No. 1,957,888;

2. Whether the record shows that claims 5, 6, and 7 of appellants' application call for anything more than the equivalent of the solvent described by Hickman patent No. 1,900,877; and

3. Whether claims 10, 11, and 14 patentably distinguish from either Hickman patent by reason of their reference to the depth of penetration of the dye.

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United States Court of Appeals
For the District of Columbia Circuit

APPEAL NO. 13,517

GEORGE F. STRADAR AND FAIRCHILD CAMERA
AND INSTRUMENT CORPORATION, *Appellants,*

v.

ROBERT C. WATSON, COMMISSIONER OF PATENTS,
Appellee.

Appeal from the Judgment of the United States District Court for the District of Columbia Circuit

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BRIEF FOR APPELLEE

INTRODUCTION

In this proceeding the appellants seek review of a decision of the United States District Court for the District of Columbia (App. 53*) dismissing the complaint (App. 2) in an action under section 145 of Title 35 of the United States Code, in which the appellants,

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* References to the Joint Appendix filed with the appellants' brief are indicated "App. ."

George F. Stradar and Fairchild Camera and Instrument Corporation, sought to have the Court authorize the Commissioner of Patents to issue a patent including claims 1 to 14 (App. 63 to 65) in application for patent Serial No. 203,310, filed December 29, 1950 (App. 55 to 67). The refusal of the patent by the Patent Office and the District Court was based upon the failure of those claims to distinguish patentably from prior disclosures.

APPELLANTS' CLAIMS

The claims involved are directed to a blank plastic engraving plate and its process of manufacture. The plate and process are alleged to be novel in that one side of the plate is impregnated with a dye to provide a visible image on the plate at the completion of the engraving operation. Certain of the claims, viz., claims 5, 6 and 7, are limited to the use of 95% methyl alcohol as a mutual solvent for the plastic base material and the tinting dye, while claims 10, 11 and 14 include reference to the depth of penetration of the dye into the plastic base.

THE HICKMAN PATENTS

The Hickman patent No. 1,900,877 (App. 108) relates to nonhalation motion picture film in which a permanent light absorbing layer is formed in the plastic film base by applying to one side of the base a solution of a suitable dye, such as an aniline dye, with a solvent which will penetrate the support sufficiently to embody the dye permanently therein (App. 109, column 2, lines 89 to 100).

Hickman patent No. 1,957,888 (App. 111) reveals that it was, at the time of that invention, common practice to treat, not only motion picture film, but photographic film base generally with a solution which acted as a partial solvent for the film base as well as for the dye. The dyes were applied to the already formed film by a series of rolls which transferred the solution to the film (App. 111, column 1, lines 4 to 11). The remainder of this Hickman patent describes an improvement on the described prior process and is not pertinent to the case, the rejection being based only on the process above described.

SUMMARY OF ARGUMENT

1. That invention is involved in use of appellants' engraving plate in the particular engraving process for which it is intended is not disputed and a claim directed to this process has been allowed.

2. Claims 1 to 4, 8, 9, 12 and 13 directed to the engraving plate itself and its method of manufacture, omit any mention of the depth of penetration of the dye or of the specific nature of the solvent, both of which the appellant Stradar testified were essential to the operability of his plate.

3. ~~Insofar as~~ claims 1 to 4, 8, 9, 12 and 13 ~~recite structure they~~ are anticipated by the Hickman patents, for they come within the [illegible] that These claims are not such that the preamble limiting their use is of patentable significance, [illegible]

4. Claims 5, 6 and 7, ~~which differ from the broad group of claims in their limitation of the solvent to "95% methyl alcohol,"~~ are not patentable over Hick-

there is no ~~showing~~ indication that 4. in those claims is not equiv. to the solvent disclosed in ~~since~~, the solvent disclosed ~~is not shown not to be~~ Hickman patent

man ~~patent No. 1,900,877, in which the disclosed solvent~~ ~~is~~ the equivalent (claims) of the appellants' insofar as the record shows.

5. Claims 10, 11 and 14, which differ from the broad group of claims by reason of their reference to the depth of dye penetration, do not refer to that feature in such a way as to distinguish from either Hickman patent.

ARGUMENT

The major part of the appellants' brief is devoted to argument that the appellants' plate represents an inventive advance in the engraving art. When limited to use in that art by a properly phrased process claim, this is undeniably true and is not a matter of controversy in this proceeding. The Board of Appeals in the Patent Office determined (App. 90) that claim 15 was patentable on the basis of the "significant and unobvious" results obtained by using the tinted plate in the particular engraving process for which it was intended. At the same time, the Board of Appeals held that the terms of claims 1 to 14 were not such as to properly define this invention. The case requires, therefore, a detailed analysis of the wording of the claims for comparison with the Hickman disclosures.

THE CLAIMS

The claims appear to fall into three groups: (1) a first group employing broad terminology in which no mention is made of the depth of penetration of the dye into the plastic or of any dye or solvent not shown to be old by the Hickman patents (claims 1 to 4, 8, 9, 12, and 13); (2) a second group of claims which differ from the first group in limiting the solvent used to "approximately 95% methyl alcohol" (claims 5, 6 and 7); and (3) a third group which differ from the first group by language referring to the depth of penetration of the dye in the base.

The Board of Appeals in its decision (App. 84) treated the claims as a group inasmuch as the applicant in presenting his case to the Patent Office made no contention that either the nature of the solvent or the depth of penetration were critically different from Hickman's.

At the bottom of page 7 and the top of page 8, of their brief the appellants seem to urge that limitation to a given depth of penetration must be read into the claims as "implicit" from the specification. This is directly contrary to the accepted rule that "the claims of an application must be given the broadest interpretation which they will reasonably support and that such claims cannot be properly rendered patentable by reading into them limitations which, although appearing in the specification, are not set out in the claims." *In re Twomey et al.,* 42 CCPA 742, 218 F.2d 593. See also *Graver Tank et al.* v. *Linde Air Products Co.,* 336 U.S. 271, *In re Cresswell,* 38 CCPA 917, 187 F.2d 632, and *In re Carr,* 54 App. D.C. 283, 297 Fed. 542.

The appellants' need to resort to the specification could be considered illustrative of the weakness of their case with respect to claims 1 to 4, 8, 9, 12 and 13. This is worthy of particular note in view of Mr. Stradar's insistence that the limitation of dye penetration constituted, perhaps, the outstanding critical difference between his process and Hickman's (App. 14, 30, 34, 35, 36, 39).

REJECTION OF THE BROAD CLAIMS

Since claim 1 is as broad as any in the first group, it may be considered representative. Claim 1 reads as follows:

> "An engraving plate for reproducing images by printing processes comprising: a finished-surface sheet of deformable soluble plastic material, only one face thereof having a surface portion treated with a mixture of a dye and a mutual solvent for the plastic material and the dye, said treated surface material retaining substantially the original character of the finished surface."

In refusing to allow claims such as claim 1, the Patent Office examiner and the Board of Appeals pointed out that the *structure* recited in the claims was fully disclosed by the Hickman patents. The appellants do not, or at least cannot, with any degree of authority, deny that the patents show a "sheet of deformable soluble plastic material, only one face thereof having a surface portion treated with a mixture of a dye and a mutual solvent for the plastic material and the dye—." Moreover, although the appellants feel otherwise (appellants' brief, pages 28 and 30), it is clear that the Hickman base material is "finished" in the broad sense that any photographic film must undergo a forming operation to give it a relatively flat surface. It should be noted that the application claims use the adjective "finished" alone, not "finished or polished" as in the appellants' brief.

Appellants' principal contentions for patentability center not on structural differences between claim 1 and Hickman's product, but, rather, on Hickman's failure to refer to the problem solved by Stradar or to suggest its solution. Consideration of these factors, however, would require that significance in a patentable sense be attached to the preamble of the claims, viz., "an engraving plate for reproducing images by printing processes—."

Whether or not the Hickman photographic films are considered to be analogous to engraving plates, it is accepted that an introductory use statement is entitled to no consideration in determining the patentability of a claim over an article having another use, *In re Jacobson et al.,* 32 CCPA 970, 148 F.2d 1011. Where as here, the claim includes no further reference to the use, the rule is, as stated in *In re Laurent,* 38 CCPA 811, 186 F.2d 741:

> "A preamble or introductory clause ~~of that nature,~~ which merely states a purpose independently of the structure otherwise completely defined by the claim, does not constitute an additional limitation of the subject matter defined by the claim. In re Beplate et al., 22 CCPA 1232, 77 F.2d 506, 25 USPQ 386. An exception to that rule governs only when the preamble or introductory clause gives meaning and vitality to the remainder of the claim."

The same thought was expressed differently by Judge Learned Hand in *H. K. Regar & Sons, Inc.* v. *Scott & Williams, Inc.*, 63 F.2d 229:

> "But a new use of an old thing or an old process, quite unchanged, can under no circumstances be patentable; not because it may not take as much inventiveness to discover it, as though some trivial change were necessary, but because the statute allows patents only for a new 'art, machine, manufacture or composition of matter'."

Moreover, it is believed clear that such statutory authority is also lacking under the present law as to claims of the type involved here, i.e., those directed to articles or methods of manufacture rather than methods of use.

No weight, therefore should be attached to the field of use defined in the preamble. Similarly, the final clause "said treated surface material retaining substantially the original character of the finished surface" defines nothing in the way of structure but, instead, a goal or objective which the appellants hope to achieve. Such statements, by accepted law, have no bearing on patentability, *S. D. Warren Co.* v. *Nashua Gummed and Coated Paper Co.*, 205 F.2d 602. If attaining an undisturbed surface is due to the use of particular solvents in particular concentrations, the invention lies in these latter factors, not the desirable result achieved.

Further, the factual basis for the appellants' contention that Hickman does not meet this feature is believed to be faulty. The record furnishes no reason to believe that the Hickman treatment would alter the surface of the photographic film disclosed in the patents. The appellants' principal ground for contending otherwise (appellants' brief, pages 30, 31) seems to be based upon the specific process disclosed in the Hickman patent No. 1,957,888 starting at line 49 in column 1 of page 1 thereof (App. 111). However, it was forcibly pointed out to the appellants by the Board of Appeals (App. 88) and again in argument in the lower Court that this part of the Hickman patent was not that relied on by the Patent Office. The rejection on this patent was based solely on the process disclosed in lines 4 to 14 of column 1 of page 1 thereof.

"A claim is both a definition and an assertion;" if it asserts too much in that it is couched in language to cover prior devices which would not have worked it is faulty because it fails to set forth the inventor's contribution to the sum of human knowledge, *General Electric Co.* v. *Nitro Tungsten Lamp Co.,* 266 Fed. 994. This rule applies with some force to the group of claims being considered since none of them refer to two features said to be vital to the success of Stradar's plate viz., the depth of dye penetration and the composition of the dye solvent. (Stradar's testimony, App. 14, lines 27 to 32)

At the bottom of page 31 and top of page 32 of their brief, the appellants enumerate the alleged deficiencies in the disclosure of the later Hickman patent. It should be sufficient to dispose of the first group of claims to point out that none of them includes *any* reference to "the particular and critical concentration of the dye composition" or the "depth of penetration of the tinting material." Moreover, they do not refer to the preservation of the nature of the surface except functionally.

Claims 1 to 4, 8, 9, 12 and 13, which must, by accepted law, stand or fall on the basis of their recited structure, are believed to be effectually anticipated by either of the Hickman patents.

CLAIMS 5, 6 AND 7 DEFINE NOTHING PATENTABLE OVER THE FIRST GROUP OF CLAIMS

Inasmuch as Hickman in patent No. 1,900,877, suggests the use of aniline dyes (page 1, lines 78 to 88) and, further, the use of methyl alcohol (page 1, lines 89 to 93) as part of his solvent mixture, the only apparent distinction thereover added by claims 5, 6, and 7, is the employment of a solvent consisting almost wholly of methyl alcohol (95%) instead of the 50% used by Hickman.

The appellants' argument as to the criticality of this matter seems to be directed solely to the importance of excluding *water* (App. 12, 13, 47, 48) from the methyl alcohol, rather than excluding other substances, such as acetone as directed by Hickman. Hickman, however, mentions no ingredients in his solvent other than alcohol and acetone and would, therefore, appear to inherently exclude water. Presumably, the methyl alcohol used by Hickman is the commercially available product (*In re Swentzel et al.,* 42 CCPA 719, 215 F.2d 272), which was admitted by Mr. Stradar (App. 47, lines 14 to 19) to be sufficiently water free. Mr. Stradar further admitted that Hickman's solution of equal parts of methyl alcohol and acetone would be inert chemically to the base material (App. 43, lines 16 to 21).

The record shows no proof that the Hickman solvent includes excessive water or is deficient in some other respect. It is believed, therefore, that claims 5, 6, and 7, in their reference to "95% methyl alcohol", add an immaterial limitation to the broad claims and offer nothing patentable thereover.

CLAIMS 10, 11 AND 14 ARE NOT PATENTABLE BY REASON OF THEIR REFERENCE TO THE DEPTH OF PENETRATION OF THE DYE

As noted above, claims 10, 11, and 14 define the depth of penetration of the dye into the plastic base. Since Hickman admittedly discloses no particular depth, the patentability of claims 10, 11, and 14, depends on (1) whether the facts of the case show the feature actually to be a critical and inventive difference and (2) whether the claims are so worded as to definitely set forth the feature.

The record in the case would appear to raise serious doubts as to whether control to any particular depth is inventive. The specification of Stradar's application, although emphasizing that the depth must not exceed the depth of penetration of the engraving stylus, establishes no specific limits, but merely suggests (1) that 0.0001 inch is exemplary of a suitable depth and (2) that the matter is best determined by experiment (App. 60, lines 12 to 21). It would seem, therefore, that the depth feature is nothing more than a matter of choice properly determined in the light of the use to which the article will be put.

The most serious defect as to claims 10 and 14 is their manner of expressing the amount of penetration in terms of the later use of the device. It is axiomatic that it is the purpose of patent claims "to inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not." *Permutit* v. *Graver,* 284 U.S. 53.

Allowance of claims such as 10 and 14 which define the dye penetration as "less than the maximum deformation by engraving" would seem to place a manufacturer in a quandry as to whether any given tinted sheet would constitute an infringement. The limitation is not one inherent in the article itself but depends on the type of engraving machine on which it will, in the future, be used. There must be no such "zone of uncertainty" in a patentable claim, *United Carbon* v. *Binney and Smith,* 317 U.S. 228. The limitation is believed to be obviously indefinite and cannot, therefore, distinguish claims 10 and 14 from the broad concept of claim 1. The appellants' brief, moreover, would appear to reveal a lack of confidence in the definiteness of these claims in the suggestion on page 38 that the expression used is rendered definite only when interpreted in the light of the specification. This is in direct conflict with the rule that the specification does not aid an applicant for patent upon the question of definiteness of his claims, *In re Jolly,* 36 CCPA 825, 172 F.2d 566.

The inapplicability of the principle in *Montgomery* v. *Marzall,* 88 U.S. App. D.C. 281, 189 F. 2d 640, to this case is clear. That case involved claims to a process of manufacture, involving an adjustment of the feed of an ingredient during the process. In contrast, the claims here are to a product and a method of making it, the characteristics of which product *depend on how it is to be used.* Such claims, obviously, do not inform the public of their limits.

Claim 11, while specifying a dimension, suffers from indefiniteness in the inclusion of the words "of the order of—." This is no more or less definite than if the depth were described as "about" 0.0001 inch. It has been consistently ruled that the term "about" is insufficiently explicit to distinguish from prior art of a different dimension, *In re Ayers et al.,* 33 CCPA 874, 154 F. 2d 182, *In re DeVaney,* 38 CCPA 735, 185 F.2d 679.

Claim 11 cannot, it is submitted, by reason of language of such flexible interpretation as "of the order of 0.0001 inch" be said to define patentable invention over the Hickman patents. "An invention must be capable of accurate definition and it must be accurately defined, to be patentable," *United Carbon* v. *Binney and Smith,* 317 U.S. 228.

CONCLUSION

For the reasons given it is submitted that claims 1 to 4, 8, 9, 12 and 13 are unpatentable as being anticipated, insofar as they recite structure, by either of the Hickman patents and further, as not reciting features said by the applicant Stradar to be essential to the sucess of his device. Claims 5, 6 and 7, while limited to a particular solvent, have not been shown to present more than the mere equivalent of the Hickman solvent. Claims 10, 11 and 14 recite the limit of dye penetration, but not in such terms that they can be said to define that it is the purpose of patent claims "to inform the public during the life of the patent of the limits of the monopoly asserted, so that it may be known which features may be safely used or manufactured without a license and which may not." *Permutit* v. *Graver,* 284 U.S. 53.

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Respectfully submitted,

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REPLY BRIEF FOR APPELLANTS

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Appellee.

Appeal from the United States District Court For the District of Columbia

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REPLY BRIEF FOR APPELLANTS

I—Introduction

It appears from Appellee's Brief that the basic point of departure between Appellants and Appellee is the patentable significance to be accorded the preamble of each of the claims on appeal and this point will be taken up first. Appellants are also in sharp disagreement with Appellee's discussion of the alleged indefiniteness of claims 10, 11, and 14 (Brief pp. 11-13). In addition, Appellee's Brief contains a number of statements which are believed to be inaccurate and unsupported by the record, but since these statements are largely unrelated to each other, they will be taken up serially after a discussion of the two main issues.

II—The Preamble of Each of the Claims on Appeal is of Patentable Significance

Each of the claims on appeal includes an introductory clause or preamble reading:

> "An engraving plate for reproducing images by printing processes" (App. 63-65)

Such a clause limits the use of the structure defined in the body of the claim following the word "comprising" to the field of engraving for reproducing images by printing. In other words, such a preamble may be considered as reciting a new field or new use for the structure following the preamble. Alternatively, assuming *arguendo* that the structure defined in the body of the claim is found in the prior art, for example, in the Hickman patents, the preamble may be considered as defining the substitution of such old structure for the prior structure used in engraving plates, namely, the clear plastic plates acknowledged in the Stradar application (App. 55-56, Exh. 4, Phys.).

The decisional authorities discuss the patentability of this type of claim under three headings without distinction: (1) the patentable significance of a preamble to a claim; (2) the patentable significance of the new use of an old material or article; and (3) the patentable significance of the substitution of one material or structure for another in a claimed article. However, in determining patentability, the tests are the same irrespective of the heading under which they are discussed, namely, does the invention defined by the claim in issue yield new and unexpected results and is it of such a character that it would have been unobvious to one skilled in the art when the invention was made? If the answer to both tests is affirmative, the claim is a patentable one whether considered as a new use of an old material or as a substitution of materials and whether the limitation supporting patentability is found in the preamble or in the body of the claim.

Appellee's assertion (p. 7) that the introductory clause or preamble of each of the claims on appeal "is entitled to no consideration in determining patentability" in this case is simply not in accord with the preponderant weight of authority, including the prior decisions of this Court.

A decision of this Court involving a factual situation quite similar to that presented here is the case of *Carbide* *and Carbon Chemicals* v. *Coe* (1938) 69 App. D.C. 372; 102 F.2d 236, which involved *inter alia* claims to a wrapper or container for food comprising a film or sheet of metal such as tin foil having a coating of a vinyl resin resistant to moisture, acids, etc., contained in the food. A "typical claim" read as follows:

> "4. A food package comprising a metallic material having at least the surface thereof which is in contact with the food product to be packaged composed of a composition which contains a substantial proportion of a vinyl resin of the group including polymerization products of vinyl esters and mixtures of vinyl esters."

The prior art disclosed food wrappers of tin foil coated with natural resin (shellac) or paraffin and also taught the protective properties of a vinyl resin coating on other materials, but perhaps the most pertinent prior art showing was in a patent to Young which described a vinyl resin coating for metal prepared with the aid of a lead compound as a catalyst. This Court referred to the teaching of the prior art saying:

> "* * * In this respect its teaching is not only negative but contrary, for in the only instance in which the use of a vinyl resin film is mentioned in contact with metal it is disclosed that the film disintegrates unless made with tetraethyl lead, a poison. The art had not answered the need in food packaging of a coating for metal packaging material which would protect foodstuffs from exterior contamination, be itself resistant to chemical action of the foodstuffs, and would itself impart no odor or taste thereto."

Thus, it is pointed out that the above-quoted claim 4 is literally satisfied by the prior Young patent *except* for the limitation in its preamble to "a food package", for which the Young coated metal was not suitable. The question was whether this limitation in the preamble alone imparted patentability to the claim because the toxic resin proposed by Young was not suitable for use in a food package. This Court held that it did saying:

> "Frazier has for the first time successfully used a vinyl resin film in contact with metal as a food container. The question in the case is, therefore, simply whether this substitution of a material whose general properties are known is invention.
>
> "We reviewed and stated the law in respect of substitution of parts in a machine or of materials in a manufacture as invention in Gasoline Products Co. v. Coe, 66 App. D.C. 333, 87 F.2d 550 (1936), and we there cited the leading cases on the subject. The upshot of the decisions of course is that there must have been inventive capacity as distinguished from mechanical or routine skill necessary to accomplish the substitution. If from the prior art or from the properties of the thing substituted, the substitution was obvious, no patent is allowable. If, on the contrary, it was not obvious, if inventive capacity was required to see the applicability to the use in question of the thing substituted, and the advantage in new and useful results or increase in efficiency or saving in operation, then a patent is to be granted. In terms of a quotation from Low v. McMaster, 266 F. 518, 519-20 (C.C.A. 3d, 1920), the law has been well epitomized thus:
>
>> 'On this subject it is the law, that merely to substitute superior for inferior materials, in making one or more or all of the parts of a machine or manufacture, is not invention, although the substitution may be of materials that are both new and useful in high degree. It is also the law, as exceptions to this general rule, that if the substitution involved a new mode of construction; or if it developed new properties and uses of the article made; or where it

> produces a new mode of operation, or results in a new function; or when it is the first practical success in the art in which the substitution is made; or where the practice shows its superiority to consist not only in greater cheapness and greater utility, but also in more efficient action, it may amount to invention.' (66 App. D.C. at 340, 87 F.2d at 557).
>
> "Since a vinyl resin film had never, prior to Frazier, been successfully used against metal except when prepared in the presence of a poison, tetraethyl lead, as a catalyst, it at least cannot be said to be clear that Frazier's substitution was obvious. * * *"

It is clear that here, as in the *Carbide and Carbon Chemicals* case, (1) the substitution of the tinted surface plastic sheet defined by the claims on appeal for the prior clear plastic sheet as an engraving plate for printing processes "was not obvious" as found by the Patent Office (App. 90); (2) that such substitution "developed new properties and uses of the article made"; and (3) that such substitution "produces a new mode of operation" and "results in a new function". Such a substitution, therefore, is patentable under the authority of the *Carbide and Carbon Chemicals* case.

In the case of *Gasoline Products* v. *Coe* (1936) 66 App. D.C. 333; 87 F.2d 550, cited in the *Carbide and Carbon Chemicals* case, *supra,* there was involved a chromium alloy coil for use in a petroleum cracking furnace to resist corrosion by the sulphur in the oil. The prior cracking coils were all steel but the prior art disclosed the general corrosion-resistive properties of chromium alloys. This Court reviewed the prior authorities holding the substitution of material to represent invention if it develops new properties and uses of the article made or a new mode of operation, if it performs a new function, or if it is the first practical success in the art in which the substitution is made, and held the invention in issue to be patentable saying:

> "In our view of what the prior art discloses, we think the conclusions of law made by the trial court to the effect that the 'claims (of the plaintiff) are unpatentable over the prior art adduced by the defendant,' and that 'no invention would be involved in making the cracking coils * * * of an alloy of iron and chromium, or of an alloy of iron, chromium and nickel in view of the patents to Kelley, Metzger, Palmer and Van Steenbergh,' are not warranted. We think that on the contrary under the record as we view it, i.e., as failing to show that the prior art taught that chromium alloy was resistant to sulphur corrosion as such, or to sulphur corrosion in the tubes of an oil cracking process, the plaintiff is, under settled principles of patent law, entitled to patent. The plaintiff discovered that the cause of corrosion in ordinary carbon steel or iron tubes in the oil cracking process was sulphur or sulphur compounds. There is no dispute in the record on this point. And the plaintiff was the first to use chromium alloy tubes in the oil cracking process; and through their use he first solved the corrosion problem. Discovery of a source of trouble not before known and the discovery and application of a remedy are well recognized as invention. Eibel Co. v. Paper Co., 261 U. S. 45."

The Courts of other Circuits have followed a similar rule. Thus, the case of *Schram Glass* v. *Homer Brooke Glass* (C. A. 7, 1918) 249 F. 228 (cert. den. 247 U.S. 520), involved a machine for molding glass articles. Defendant contended that in determining the validity of the patent, the introductory clause of each claim should be ignored. The Court rejected that contention and sustained the claims saying:

> "It is further contended that Brooke's discovery, if patentable, was not covered by the claims in question. To reach this conclusion appellant asks us to ignore the first clause of the claim, which is as follows:

> 'An automatic device for cutting or separating an unsupported freely flowing stream of molten material into unformed molten mass.'
>
> "Appellant contends that this is a mere statement of a process, and has no place in a mechanical apparatus, and should be entirely disregarded when appearing in a claim of an apparatus patent. With this conclusion we cannot agree. While it is true that this clause of itself does not describe an element in the combination, it should not for that reason be ignored. Each of the elements of the combination should be read in the light of this clause and should be modified by it. *Such a clause* of itself may entirely fail to supply a necessary element in a combination (American Envelope Co. v. A. W. P. Co., 152 U. S. 425, 14 Sup. Ct. 627, 38 L. Ed. 500) yet it *may so affect the enumerated elements as to give life and meaning and vitality to them,* as they appear in the combination. So, in this case, the legitimate and fair construction of the claims, particularly in view of the specifications and drawings, requires us to read on each element of this claim the clause which appellant insists is a superfluity. In so doing we are not substituting an operation for an element, nor including as an element the particular article upon which the apparatus is to work. *We are merely giving to the modifying clause the same effect that would be given to an adjective or adverb that limits, enlarges, or qualifies the word it modifies."* (Emphasis added)

Here, as in the *Schram Glass* case, the introductory clause "An engraving plate for reproducing images by printing processes" gives "life and meaning and vitality" to the structure recited in the body of the claim. In the absence of such introductory clause, the expression "finished surface sheet" in each of the claims has no significance, for only in an engraving plate is it necessary to have such a finished or polished surface (App. 41). In the absence of such an introductory clause, the subsequent recital that the surface of the plastic sheet retains the "original character of the finished surface" after treatment with the dye mixture has no significance for the same reason. In the absence of such introductory clause, the recital in each of claims 5, 6, and 7 of a solvent comprising 95% alcohol (not more than 5% residual water) is of no significance, for only in an engraving plate is it essential that there be no appreciable softening of the surface which would result from the use of lower concentration of alcohol (App. 44-45, 47-48). In the absence of such an introductory clause, the recital in each of claims 10, 11 and 14 of the depth of penetration of the dye into the plastic surface would be of no significance, because the sole purpose in relating the depth of penetration of the dye to the depth of penetration of the engraving tool is to ensure the desired contrast in the resulting engraved plate. Here, as in the *Schram Glass* case, the introductory clause should be given "the same effect that would be given to an adjective or adverb" in qualifying the structure to which it applies.

The Court of Appeals for the Seventh Circuit reaffirmed its ruling in the *Schram Glass* case in the later case of *Nordberg Mfg.* v. *Woolery Machine* (1935) 79 F.2d 685. That case involved claims to a machine for tightening railway rail bolts which included the feature of an automatic release upon reaching a predetermined tightening pressure. The prior art showed numerous power driven and hand tools having releases in response to various conditions. In rejecting such prior art and sustaining the validity of the claims in suit, the Court said:

> "The District Court's ruling in sustaining the claims in suit was explicitly based upon the principle that the first clause of the claims, 'in a machine of the character described' should be constantly considered in determining the question of anticipation. That premise is sound. By it the scope of the patent is limited, and by

> it the patent is protected against alleged anticipations. *This court has held claims valid in which elements were literally met in some non-analogous use device, but where the reference was intended to operate for a different purpose and object, and did not answer the introductory clause of the claim.* Duncan v. Stockham, 204 Fed. 781; Schram Glass Mfg. Co. v. Homer Brooke Glass Co., 249 Fed. 228; Benoit v. Wadley Co., 54 F.(2d) 1041. These decisions are supported by the following: Seymour v. Osborne, 11 Wall. 516; Consolidated Roller Mill Co. v. Walker, 138 U.S. 124. * * *'' (Emphasis added)

The Courts of the Second Circuit have followed a similar rule. Thus, the case of *P. R. Mallory* v. *Automotive* (S.D. N.Y., 1930) 45 F.2d 810, involved a number of claims to a contact for ignition systems, the first claim reading:

> ''1. An electrical make-and-break contact of tungsten.''

The Court sustained the validity of the claim over the defense that its preamble defined merely a new use of the material tungsten saying:

> ''The defendant strongly urges that all that Coolidge did was to substitute one material for another, namely, tungsten for platinum. But in my judgment Coolidge's invention was not a mere substitution, as it appears from the weight of the evidence that tungsten, when used for a make-and-break contact in automobile ignition systems, both battery and magneto, withstands wear for a longer period than platinum or platinum iridium, and produces superior results, particularly in battery ignition systems, the evidence in the case at bar being confined to these; and tungsten is much less expensive than platinum.''

A very similar situation was presented in *General Electric* v. *Hoskins* (C.A. 7, 1915) 224 F. 464. That case involved a patent on an electrical resistance element composed of a prior-known chromium alloy. The patent was sustained over the defense of new use of old material in view of the decided cost advantages over platinum, the only prior material used for resistance elements having comparable characteristics.

Again, the case of *Ludlum Steel* v. *Terry* (N.D. N.Y., 1928) 37 F.2d 153, involved *inter alia* the following claim to a stainless steel valve for automobile engines:

> "6. 'Valves for internal combustion engines made from alloy steel containing silicon about 3.7 per cent., chromium about 8.9 per cent., carbon about .46 per cent., and the principal part of the remainder iron.' "

The particular alloy specified in the claim was described in an earlier patent of the same inventor and defendant contended that there was no invention in substituting this alloy for the conventional steel alloy in such a valve. The Court, however, gave effect to the introductory clause, the sole distinction over the patentee's prior patent, and held the claim valid saying:

> "Keeping in mind the state of the art, the conviction that silicon was to be avoided, and that, when the Armstrong valve patent issued, experts were puzzling over this valve problem, there was invention in Armstrong's adaptation of silicrome steel to use for exhaust valves to obtain a result which was not only new and unexpected from a silicon alloy, but which also filled a need which had long been recognized. * * *"

Traitel Marble v. *Hungerford Brass & Copper* (C.A. 2, 1927) 18 F.2d 66 (cert. den. 274 U.S. 753), is the classic case on the rule that relatively insignificant changes of a prior article will support invention if the changed article is put to a new use yielding unexpected results. In that case a Calkins patent in suit covered a brass separator strip for use in laying a terrazzo flooring. A prior patent to

McKnight showed a quite similar separator strip for use in laying concrete pavement. In holding the claims in suit valid and infringed the Court said:

> "* * * in view of the fact that McKnight's purpose and his result were quite different, structural distinctions which might be trivial become crucial.
>
> "Assuming, for argument, that the law is absolute that there can be no patent for the new use of an old thing, that is because the statute allows no monopolies merely for ideas or discoveries. If the thing itself be new, very slight structural changes may be enough to support a patent, when they presuppose a use not discoverable without inventive imagination. We are to judge such devices, not by the mere innovation in their form or material, but by the purpose which dictated them and discovered their function."

As in the *Traitel Marble Case,* the plastic sheet with a finished or polished surface, not found in the Hickman films, is a "crucial" characteristic when the sheet is used as an engraving plate, although it would have been of no significance in Hickman's motion-picture film, even had he disclosed it. The same is true of the 95% concentration of the alcohol solvent and the depth of penetration of the dye mixture relative to the depth of penetration of the engraving tool in the final engraved plate.

Perhaps the leading case on this point arising from the review of Patent Office decisions is *Kropa* v. *Robie et al.* (C.C.P.A., 1951) 187 F.2d 150. This was an appeal in an interference proceeding in which one of the questions to be decided was whether the preamble of the claim of the Robie et al. patent reading "An abrasive article" was entitled to patentable significance. This question arose from the fact that Kropa's parent application disclosed the material positively claimed in the body of the claim but the Court found that it did not disclose its use as an abrasive article. The Court reviewed all of its prior decisions (37) on the question of the patentable significance of the preamble of a claim, both in *ex parte* and *inter partes* proceedings, and distilled their rulings as follows:

> ''Is the phrase 'An abrasive article' a limitation upon what follows in the counts in issue? This court has often had before it the Jepson problem (243 O.G. 525—1917) —whether the preamble to claims in ex parte cases or to the counts in interference cases should be considered as limitations in the claims or counts. Of the thirty-seven cases of this court we have reviewed with respect to this problem it appears that the preamble has been denied the effect of a limitation where the claim or count was drawn to a structure and the portion of the claim following the preamble was a self-contained description of the structure not depending for completeness upon the introductory clause; or where the claim or count was drawn to a product and the introductory clause merely recited a property inherent in the old composition defined by the remaining part of the claim. In those cases, the claim or count apart from the introductory clause completely defined the subject matter, and the preamble merely stated a purpose or intended use of that subject matter. *On the other hand, in those ex parte and interference cases where the preamble to the claim or count was expressly or by necessary implication given the effect of a limitation, the introductory phrase was deemed essential to point out the invention defined by the claim or count. In the latter class of cases, the preamble was considered necessary to give life, meaning, and vitality to the claims or counts. Usually, in those cases, there inhered in the article specified in the preamble a problem which transcended that before prior artisans and the solution of which was not conceived by or known to them.* The nature of the problem characterized the elements comprising the article, and recited in the body of the claim

> or count following the introductory clause, so as to distinguish the claim or count over the prior art. There is set forth in an appendix to this opinion an analysis of the thirty-seven cases mentioned to which further reference may be made.
>
> "In the case before us, the words 'An abrasive article' are essential to point out the invention defined by the counts. In our judgment those introductory words give life and meaning to the counts, for it is only by that phrase that it can be known that the subject matter defined by the claims is comprised as an abrasive article. Every union of substances capable inter alia of use as abrasive grains and a binder is not an 'abrasive article.' The term calls forth a distinct relationship between the proportions of grain and resin comprising the article. * * *"

Just as the introductory words "An abrasive article" in the *Kropa* v. *Robie Case* were "essential to point out the invention" and gave "life and meaning" to the claims there in issue, so here the introductory clause "An engraving plate for reproducing images by printing processes" serves exactly the same functions. Here, as in the *Kropa* v. *Robie Case*, "there inhered" in the engraving plate "specified in the preamble a problem which transcended that before prior artisans and the solution of which was not conceived by or known to them". No decisions of this Court have been found which are in any way inconsistent with the ruling in the *Kropa* v. *Robie Case*, but its decisions in the *Carbide and Carbon Chemicals Case* and the *Gasoline Products Case*, both supra, clearly are in harmony therewith.

It is submitted that under the foregoing authorities the introductory clause of each of the claims in issue constitutes a limitation on the invention defined by such claims. Further, it is submitted that each of the claims, so limited, patentably distinguishes from the Hickman patents which fail to solve

Appellants' problem or to teach anything which would contribute to such a solution (see Main Brief, pp. 20-28).

In support of its contention that the introductory clause is entitled to no patentable significance, Appellee cites (pp. 7-8) the following cases:

> *In re Jacobson et al.,* (1945) 32 CCPA 970; 148 F.(2d) 1011
>
> *In re Laurent,* (1951) 38 CCPA 811; 186 F.(2d) 741
>
> *H. K. Regar & Sons, Inc.* v. *Scott & Williams, Inc.,* (C.A. 2, 1933) 63 F.(2d) 229

However, the actual decisions in those cases are not apposite to the facts of the instant case. It is true that *In re Jacobson et al.* contains the following dictum:

> "In the brief and argument for appellants before us, some emphasis is placed upon the 'selective' feature appearing in the introductory clauses of all the claims except 29.
>
> "Instances in which the introductory clause of a claim may be taken as a limitation on the claim are very rare. The general rule is well known to be to the contrary (see Deutsch et al. v. Ball, 22 C.C.P.A. (Patents) 1322, 77 F.2d 930, 25 USPQ 470, and cases therein cited), and we discern no reason to justify an exception in this case."

However, the gist of the decision was that the prior art disclosed what appellant had done *even including the selective feature recited in the preamble.* In any event, this case was considered by the Court in the later *Kropa* v. *Robie* case, *supra,* and if it is, in part, inconsistent with this later case it must be considered to be *pro tanto* overruled.

In the case of *In re Laurent, supra,* the pertinent facts and ruling appear from the following excerpt from the decision:

> "The structural limitations set forth in the body of claim 47 define a complete and operative structure shown to be conventional by each of the disclosures of Bride and Bullington. Prior to the recitation of those limitations, claim 47 in an introductory clause calls for 'A ring to be positioned between two differently tapered faces to provide a seal due to the relative movement of the member having the lesser taper and due to the pressure being exerted on such last member and the ring to form and maintain the seal.'
>
> "A preamble or introductory clause of that nature, which merely states a purpose independently of the structure otherwise completely defined by the claim, does not constitute an additional limitation of the subject matter defined by the claim. In re Beplate et al., 22 C.C.P.A. (Patents) 1232, 77 F.2d 506, 25 USPQ 386. An exception to that rule governs only when the preamble or introductory clause gives meaning and vitality to the remainder of the claim. In re Rockwell, 32 C.C.P.A. (Patents) 1177, 150 F.2d 560, 66 USPQ 215. That is not the situation here.
>
> "The portion of claim 47 which follows the introductory clause is a sufficiently clear and self-contained description of structure so that the introductory clause, as a statement of the intended use or purpose of the structure, introduces no limitation into the claim and hence cannot be relied upon to confer patentability upon it."

That is not the situation here in which the preamble "gives meaning and vitality to the remainder of the claim", as pointed out above.

In the case of *H. K. Regar & Sons* v. *Scott & Williams, supra,* there was involved a patent on the process of knitting women's stockings with a scalloped folded hem. The evidence showed a prior folded hem stocking which, due to the manner of knitting, was inherently scalloped although this effect was not intended or appreciated. While the decision includes dictum to the effect that the general rule is that new use of an article is not patentable, the Court held that actually the question of new use was not involved but that the real question was whether a new appreciation of a prior existing characteristic was patentable. The Court held that it was not and went on to say:

> "* * * In the case at bar it is indeed hard to find even a new use; perhaps it would be more accurate to speak of a use for what had theretofore been thought useless. * * * If later, women came to prize a scalloped edge, it was not possible to monopolize it by claiming as an invention the discovery that they prized it."

The authorities relied upon by Appellee do not detract from the weight of authority analyzed above, which establishes that in the factual situation presented here the introductory clause or preamble of each of the claims is a patentable limitation on the body of the claim.

III—Claims 10, 11, and 14 Are Reasonably Definite

In considering the question of definiteness, the rule of reason must be applied. Claim language need be no more definite than required to instruct the practical worker in the art of the limits of the invention. In the instant case, it is common knowledge that the maximum depth of penetration of the usual half-tone engraving plate does not exceed a few thousandths of an inch. The only critical requirement as to the depth of penetration of the tinting dye in Appellants' invention is that it be substantially less, for example, 1/10,000 inch, so that when the plate is engraved, the engraving tool will cut through the tinted surface layer and expose the untinted body of the plate behind. There is nothing esoteric or hidden about the proper depth of penetration. It is not important whether it be one, a fraction of, or several ten-thousandths of an inch. This relationship, as defined in claims 10, 11, and 14, is sufficient to instruct one skilled in the art as to the practical limits of penetration of the tinting dye mixture.

These claims would not "place a manufacturer in a quandary" as to infringement, as suggested by Appellee (p. 12) unless he were deliberately attempting to skate down the thin boundary line between infringement and non-infringement. One who pursues such a course always assumes the consequential risk. The authorities are uniform to the effect that claims never need be more definite than reasonable under the circumstances. As was said by the Supreme Court in *Minerals Separation, Ltd.* v. *Hyde,* 242 U.S. 261,270:

> "* * * the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter."

Appellee suggests (p. 12) that the interpretation of claims cannot be aided by reference to the specification, but this is not the weight of authority. Thus, in *Paul E. Hawkinson Co.* v. *Wilcoxen* (C.A. 6, 1945), 149 F.(2d) 471, the Court of Appeals reversed a holding of the lower court that the claims involved were invalid for indefiniteness, saying:

> "* * * *The claims of a patent are always to be interpreted in the light of its specifications and drawings.* This canon of construction is as old as the patent law itself and finds its latest pronouncement in *Schriber Co.* v. *Cleveland Trust Co.,* 311 U.S. 211, 217." (Emphasis added)

Appellee contends (p. 12) that *Montgomery* v. *Marzall,* 88 App. D.C. 281, 189 (F.(2d) 640, is not applicable because the facts there were somewhat different. However, it is a difference without a distinction. There is nothing found in the *Montgomery* decision which limits its applicability as suggested by Appellee.

Appellee criticizes (p. 13) claim 11 in specifying the depth of penetration of the dye as "of the order of 0.0001 inch" asserting that the expression is equivalent to "about 0.0001 inch" which he asserts "is insufficiently explicit to distinguish from prior art of a different dimension". There are several answers to this assertion. In the first place, it is interesting to note that one of the claims involved in the *Montgomery Case,* supra, included the terms "oil in an amount in the order of one-tenth to one per cent. of the weight of the coating composition". Claim 11, in issue, is more definite than that. Secondly, the use of the term "about" in referring to a value has been generally accepted. In the case of *Lever Bros.* v. *Proctor & Gamble* (C.A. 4, 1943), 139 F.(2d) 633, the Court approved a claim to the process of making bar soap from a soap mass "containing less than about 25% moisture". In the case of *In re George* (1934), 21 C.C.P.A. 838; 68 F.(2d) 571, the Court approved claims referring to a component in terms of "about 8% to 40%". *In Exparte Shelton* (1950), 92 USPQ 374, the Board of Appeals approved of the term "about" in referring to a temperature of heat treatment. In the third place, the expression in issue is not used to distinguish from a "different dimension" of the prior art. As appellee states (p. 11) "Hickman admittedly discloses no particular depth".

In support of his criticism of claim 11, Appellee cites (p. 13) and relies on:

> *In re Ayers et al.,* (1946), 33 CCPA 874; 154 F.(2d) 182;
>
> *In re DeVaney,* (1950), 38 CCPA 735; 185 F.(2d) 679.

But these decisions are not apposite. In the *De Vaney* case there was involved a claim to the process of treating ore with a composition having an alkalinity "of from about 8 to about 10" pH. The Court found no occasion to criticize the claim for indefiniteness but held that it was anticipated by a reference patent disclosing an alkalinity of "about 7.0" pH, saying:

> "It is noted that appealed claims 6 and 9 call for alkalization of the pulp to a pH of from *about* 8 to *about* 10 and claim 10 fixes only a minimum limit of 8. Obviously, appellant himself requires flexibility in the meaning of the term 'about'. * *" (Emphasis Court's)

Similarly, the *Ayers* case, *supra,* is not in point. In that case there was involved a claim to a process for treating iron oxide by heating it within a zone containing "at least about 10% of a certain chemical. Again the Court found no occasion to criticize the claim for indefiniteness but found it anticipated by a prior patent which showed a similar process utilizing a concentration of the chemical not to exceed "about 8%".

IV—Statements in Appellee's Brief Believed to be Inaccurate or Unsupported by the Record

For the sake of brevity, each of the statements to which exception is taken is quoted, followed by a brief comment.

> "* * * applicant in presenting his case to the Patent Office made no contention that either the nature of the solvent or the depth of penetration were critically different from Hickman's." (Page 5)

While this statement is literally true, it is misleading. The final rejection by the Examiner was primarily on a patent to Ford, the Hickman patents being mentioned only incidentally (App. 71-72, 78). It was only *after* Stradar filed his Brief before the Board of Appeals, putting principal emphasis on distinguishing from Ford, that the Examiner shifted his position, withdrawing his rejection on Ford and rejecting the claims solely on the Hickman patents, which Appellants never considered pertinent.

> "* * * This is worthy of particular note in view of Mr. Stradar's insistence that the limitation of dye penetration constituted, perhaps, the outstanding critical difference between his process and Hickman's (App. 14, 30, 34, 35, 36, 39)". (Pages 5-6)

The citations do not fairly support the assertion. Stradar described the essential features of his invention at page 13 of the Appendix. It is pointed out in Appellants' Main Brief (pp. 21-31) that the majority of these essential features is lacking from the disclosures of the Hickman patents.

> "* * * it is clear that the Hickman base material is 'finished' in the broad sense that any photographic film must undergo a forming operation to give it a relatively flat surface. It should be noted that the application claims use the adjective 'finished' alone, not 'finished or polished' as in the appellants' brief". (Pages 6-7)

The uncontradicted testimony is that a "finished" surface as used in the Stradar application means a polished surface and that no ordinary motion-picture film, such as described in the Hickman patents, has such a finished surface (App. 41).

> "* * * The record furnishes no reason to believe that the Hickman treatment would alter the surface of the photographic film disclosed in the patents." (Pages 8-9)

The uncontradicted testimony is to the effect that the solvent disclosed in the first Hickman patent 1,900,877, a mixture of acetone and methyl alcohol, would damage the surface of Stradar's plate:

> "Q. In other words, it is your view that the specific solvent disclosed by Hickman would not be satisfactory for your purpose? A. It would be harmful; yes, sir." (App. 43)

As to the second Hickman patent 1,957,888, Appellee, as did the Board of Appeals, relies only on the general statement of the prior art at page 1, Col. 1, lines 4-14. This is such a vague and general description of the process that it gives no indication as to whether or not the surface of Stradar's plastic sheet would be softened or altered by such a treatment (see Appellants' Main Brief, pp. 31-34).

> "The appellants' argument as to the criticality of this matter seems to be directed solely to the importance of excluding *water* (App. 12, 13, 47, 48) from the methyl alcohol, rather than excluding other substances, such as acetone as directed by Hickman." (Page 10)

The uncontradicted testimony of Stradar was that Hickman's mixture of alcohol and acetone alone would have been harmful to his plastic engraving plate (see preceding comment). As Appellee suggests, Stradar *also* testified that the presence of more than 5% water in the alcohol would damage the surface of his engraving plate.

> "* * * Mr. Stradar further admitted that Hickman's solution of equal parts of methyl alcohol and acetone would be inert chemically to the base material (App. 43, lines 16 to 21)". (Page 10)

This statement, while literally true, is misleading and irrelevant. We are not concerned here with chemical reaction between a plastic sheet and the solvent and dye mixture, but only a temporary physical dissolving and softening of the surface during the dyeing operation (App. 61, lines 15-19).

V—Conclusion

It is submitted that there is nothing found in Appellee's Brief which alters the submission in the Appellants' Main Brief that the judgment of the Trial Court should be reversed.

Respectfully,

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